The Electrical Review

VOL. CXVIII. JUNE 19, 1936. No. 3056.

THE OLDEST ELECTRICAL PAPER. ESTABLISHED 1872.

Published every FRIDAY, Price 6d.

THE ELECTRICAL REVIEW, DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1.

Telegraphic Address: "AGEEKAY, SEDIST, LONDON." Code, A B C. Telephone No.: Waterloo 3333 (50 lines).

The "Electrical Review" is the recognised medium of the Electrical Trades and has by far the largest Circulation of any Electrical Industrial Paper in Great Britain.

SUBSCRIPTION RATES, Postage Free: United Kingdom, £1 14s. 8d. Canada, £1 12s. 6d. Colonial and Foreign, £2 1s. 6d. per annum. Cheques and Postal Orders (on Chief Office, London) to be made payable to ELECTRICAL REVIEW, LTD., and crossed "Lloyds Bank."

Classified Advertisements—Official Notices—Tenders—Supp. 9.

Index to Advertisers—Page xl.

Principal Contents:

	PAGE
Deliberate Planning	893
Surveying for Increased Business	895
Safety in the Home. By W. Lawson	899
Modernising London Restaurants	900
The Edinburgh Discussions	901
Further Notes on the I.M.E.A. Exhibition	905
An Electrical Treatment for Railway Lines	907
The Reyrolle Jubilee	908
Correspondence: Anonymous Advertisers	908
New Apparatus and Devices	909
Electricity in the Garden	910
British Overseas Electrical Trade	911
World Electricity Supply	912
Parliamentary News	913
In the Courts	913
Business and Industrial Notes	914
Electricity Supply	918
Traction and Communications	920
Contract Information	921
Notes	922
Our Personal Column	923
Financial Section	924
Published Specifications	927
New Work for Contractors	928

Deliberate Planning

BROADLY speaking, there is general agreement regarding the practice of producing electricity. We have a large mass of accumulated engineering experience to draw upon in design and operation, and, while details may not be cut and dried, we know how far we are likely to travel within the next few years.

This approximation of practice becomes less pronounced the farther we get from the generating station; indeed, much more might be done towards securing uniformity in methods of distribution without in any way strangling technical progress.

It is when we come to the utilisation of electricity, however, that we find not only pronounced differences in practice but in outlook and principles also. This is apparent from the discussions that take place on papers on this aspect of electricity supply that are read before any society. Up to this point we have been dealing with apparatus functioning in accordance with known scientific laws, but thereafter the conditions become more complex—the means adopted for applying electricity have not only to be sound from the point of view of the electrical engineer, but must comply with preferences and prejudices that are not governed by invariable formulæ.

A further difference is that the objective of generation and distribution engineers is definitely limited to a specified end, that is, to meet a demand that exists, whereas in dealing with consumers just as important a part of the work is to create the demand. Thus the possibilities of the industrial field are not bounded by the substitution of electricity for some other method of doing the same thing, nor even by extending the use of electricity to the many fields for which the overall economic justification may be real, if not superficially apparent. Account must also be taken of the opportunities for using electricity in new ways, the scope of which falls outside the ordinary training of the supply undertaking man, and may be unappreciated by the industrialist. Here the independent consultant should be able to help.

That the greater scope for improvement at the utilisation end is becoming far more widely recognised is shown by the more earnest attempts made nowadays to co-ordinate experience, with a view to selecting the best as a guide to the lines of future practice. Thus all the papers discussed at the I.M.E.A. Convention last week bore upon particular aspects of utilisation instead of on the problems of generation, transmission and distribution to which time used to be allocated.

As part of our contribution to the subject, we have consistently presented to our readers news of the development work carried out by progressive supply undertakings, and this week we include a study of the methods adopted by a protagonist of planned load building—the North-Eastern Electric Supply Co. Even after an active development of its area since the beginning of the century, during which the ultimate purpose of its considerable technical achievements has always been borne in mind—the provision of a public service—the company still finds saturation as far away as ever.

This is probably an under-statement, as hitherto with each technical improvement in supply and utilisation the saturation point has receded further into the future, so that Mr. E. Seddon's advice to undertakings that they should plan their networks for four times the present demand would appear to be open to criticism only on the grounds that it is too conservative.

World Electrification

THE rapid progress of electrical development in practically all parts of the world should make the electrical engineer a man of great faith in the future of his calling. It does everybody good to lift his eyes occasionally above the work of the moment and contemplate what is happening overseas, for there, as at home, electrical applications of many kinds are becoming indispensable and increasingly popular. If ever the use of the word "saturation" bore any semblance of truth in connection with electricity sup-

ply it was because we had an incomplete conception of electrical potentialities. Nowadays no limit is placed upon electrical possibilities in any country—we seldom hear much about the things that electricity *cannot* be made to do. Wars, world depression and international disputes have produced both adverse and favourable effects, but a world returning to peace and prosperity causes a most perceptible leap forward electrically.

Overseas Outputs

BRITAIN is not alone in her increasing production and consumption of electricity, as we show statistically in the article on "World Electricity Supply" published on page 912 of this issue. The returns which have been collected for this article by a German publisher do not, of course, claim to be complete, but they enable one to gain a fairly accurate impression of the upward movement that is proceeding in most of the principal countries of the world. And if we are to-day convinced that the term "saturation" cannot with truth be applied to even some of the most highly developed areas in Britain, still more may we visualise a great expansion in countries overseas where the electrical engineer has hardly begun his work in earnest. Henceforth the markets of the world should have a voracious appetite for electrical manufactures. The Home market is greater than it ever was, and it must grow in importance as the hundreds of thousands of new consumers come on to the mains and existing consumers add to their "other uses." The same sort of thing is happening abroad and will continue for years to come—nobody can predict for how long.

Our Export Trade

MEANWHILE we are brought back to our own trade figures for the month of May and to the overseas activities mentioned in the remarkable annual report just issued by the General Electric Co., Ltd. The former show that, apart from a small decrease in the January electrical exports as compared with those of the corresponding month of 1935, there has been a continued advance in the value of shipments. The May total was 5 per cent. above the May, 1935, figure, while for the first five months of the year the increase has been in the neighbourhood of 11 per cent. The General Electric Co. has for many years past made a very strong feature of overseas trade expansion and the past year's operations show continued advance. Its branches in India, Australia, South Africa and Argentina have done well, the Malay States show improvement, and other countries, particularly Palestine, are mentioned as developing an increasing market for electrical products. "Extremely difficult conditions" are the words used in relation to trading in China and in France. The importance of overseas trade to the British electrical manufacturing industry is not lessened by the prevailing prosperity due to the Home demand. It is particularly essential at a time when the world electrical movement is accelerating its pace that our producers should redouble their efforts and bring the high quality of their manufactures effectively before overseas buyers.

Papers in Abstract

A WELCOME innovation at last week's I.M.E.A. Convention was the reading of the papers in abstract. There seems everything to be said for this practice. The author can eliminate unessential details, valuable no doubt in themselves but, in any case, familiar to those interested enough in the subject to have read carefully the copies circulated in advance. He runs no risk of boring his audience by repeating what they already know, or could know if they wanted to. More important, however, is that his brevity allows time for a discussion, the promotion of which should be the object of most papers; it also leaves him with more energy to reply adequately to difficult questions. There are other technical bodies that might well follow suit next session.

Worse than Darkness

STATEMENTS to the effect that bad lighting of our roads, meaning poor visibility and contrasts in luminous intensity, is more dangerous than no light at all, appeared to be accepted as something more than a paradox by those taking part in the discussion on street lighting at the I.M.E.A. Convention. Within the specialist definition of adequate illumination this contention can be sustained. At the best bad lighting is waste of money. In view of the awakened public interest in road safety it is strange that full advantage has not yet been taken of so obvious a means of reducing accidents at night as that provided by well-arranged uniform illumination of high intensity.

The Big Kitchen

THOSE cautious undertakings which await the results obtained by others in charging the very low rates necessitated by certain types of load before tackling such problems themselves may be glad to learn that a large class of consumer exists for which there is no need to "slaughter" prices. That is the commercial cooking load. The kitchen needs to be laid out as a carefully designed unit, and undertakings, with or without a specialist in this work on their staff, should find out what E.D.A. can do for them in this way.

Electricity and Fire Risk

THE question of how to give information regarding the safe use of electricity without frightening the consumer was discussed in our issue of June 12th by Mr. H. Marryat, who also referred to the position of the fire insurance companies. In a recent issue of *The Policy* some simple advice is given to the householder by Mr. T. W. MacAlpine, which may be useful to contractors and others desirous of reassuring anxious clients. After mentioning the custom among the ignorant of attributing the unexplained cause of any fire to electrical defects, he reduces the main risks to two, *i.e.*, those due to (1) the substitution of heavy wire for the fuse put in by an electrician and (2) the misuse of twisted flex. This summary is, of course, intended for the instruction of the uninitiated and assumes that the installation itself has been properly carried out and maintained.

Economy and Satisfaction

WE were rather struck by the good sense contained in the contribution by Councillor Mrs. Roberts (vice-convener of the Glasgow Electricity Committee) to the discussion on Mr. G. H. Lake's water-heating paper at Edinburgh. She said: "Electricity is cheap to use, but expensive to waste." This aphorism puts into a nutshell the imperative need for the instruction of consumers in the correct use of electricity if they are to be satisfied users, and, consequently, users of increasing quantities of electricity. There is a technique in the employment of electricity in the home, easy to learn and productive of great economy. We may instance the use of residual heat in ovens and hot plates, as one outstanding example. Mrs. Roberts also advocated the inclusion of women in Electricity Committees. The desirability of this is obvious when women are so much looked to for the advancement of domestic electricity supply.

Unauthorised Distributors

Two cases of an unusual nature are reported in this issue, both relating to the supplying of electricity by consumers to their next-door neighbours. In one case a small fine was imposed and the other was dismissed on payment of costs, warnings being uttered by the Bench on both occasions. It is pleasing to see satisfied consumers spreading the electrical idea, but they must not allow their enthusiasm to run to the length of spreading electricity as well. We can hardly imagine the curious networks which would come into being if this practice were allowed to proceed unchecked. And think of the complications with which a future McGowan Committee would have to deal!

Surveying for Increased Business

Load-building activities in the North-Eastern area

COMMERCIAL surveying is a prominent feature of the load-building work of the North-Eastern Electric Supply Co., Ltd. For instance, we recently learned something of the exhaustive and expert work that goes on, perhaps for a few months, in a colliery before the company gives the colliery owners an authoritative statement on the case for change-over to electrical service. Similarly, with farms and quarries, thorough surveying is the spadework which results in the undertaking being able to offer a reliable consulting service to the consumer, the reward arising out of the proven fact that such a service sells electricity.

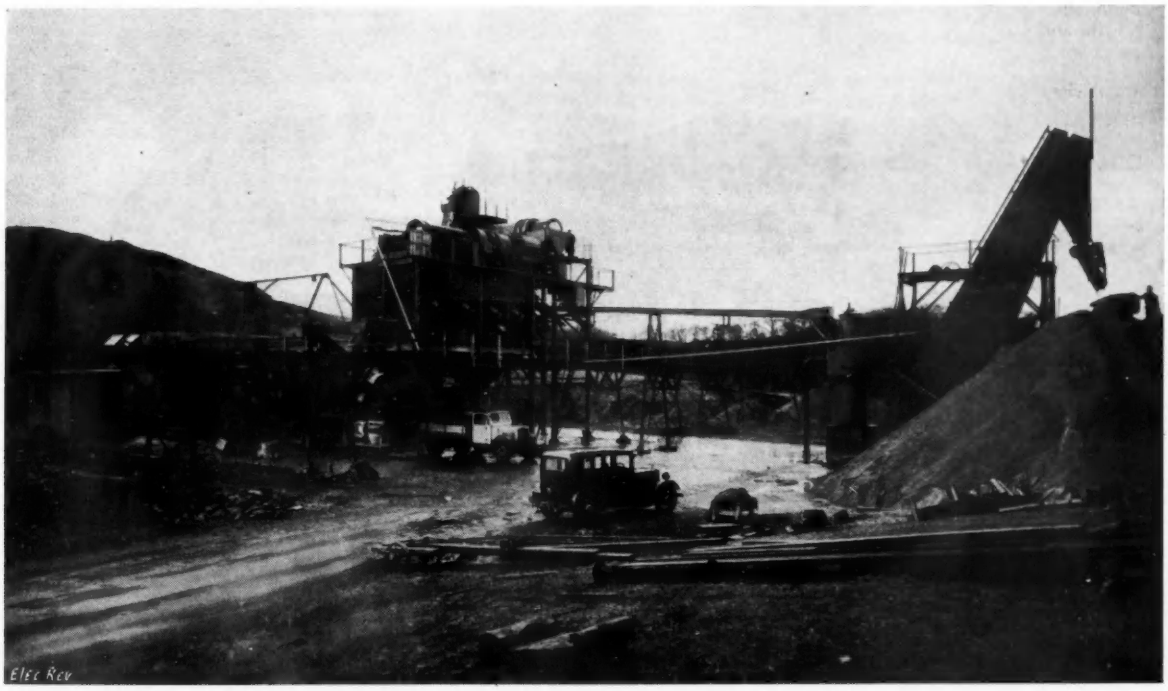
Even more advanced surveying is represented by the possible development curves which have been prepared. Graphical subtraction from the total number of dwellings of those which are undesirable or uneconomically situated, from the undertaking's point of view, gives 100 per cent. connection curves for both the company's total distribution area and also for that area after deducting supplies provided by unauthorised undertakings. The connection curve, for the company's system only, shows that this ideal will probably be attained in about 1944, and that it could apply to the whole area. The curves, of course, refer mainly to domestic consumers, for which, with offices, shops, and other premises, there is a separate sales organisation at work on a plan drawn from efficient surveying under the direction of Mr. W. F. T. Pinkney, who controls the Lighting and Heating Department. The canvassing staff, under Mr. S. G. Jones, deals with all types of domestic business. There are teams, each with a leader who is theoretically responsible for the work done, and one call on every non-consumer every six months is aimed at. Increasing importance is attached to intensive canvassing, however, and a few years back a special campaign provided that each salesman should call upon 500 non-consumers once a month. The most interesting thing about this scheme, we think, is that after the intensive campaign was stopped the rate of development did not fall to what it was before the effort, thereby indicating that fears that such work might ultimately defeat its own ends were unfounded. One result of intensive campaigning was that in three years a position in water-heating development was arrived at comparable with the result of twenty-five years' effort in connection with cooking supply. The "prospect" is the salesman's "prepared raw material," and working to quota, with a daily reminder of what should be done, is an essential part of the survey plan.

Overcoming Coal Competition

The water-heating development referred to is a great achievement in the north-eastern counties, where coal is electricity's real competitor. A considerable proportion of the electricity consumers are those able to obtain low-priced or free coal, and in this connection we suggest that the company's sliding-scale tariff must play an important part. The 90,000 consumers now on this scale represent about half the total residential consumers of the undertaking, the other half being supplied through prepayment meters which are being steadily changed over from the flat-rate to the load-rate type. The recently revised sliding tariffs, by the way, are from 4d. to ¾d. per kWh in the densely populated places like Newcastle and Gateshead, and from 5½d. to ¾d. per kWh in most of the less populous areas. The 18,000 new consumers connected last year represent an installed load of about 66,700 h.p., nearly half of which is credited to domestic supply.

At Carliol House

Apart from the consulting work of the specialists, the service idea is, we think, given strongest expression in Carliol House, where we saw in the main cooking demonstration room a morning "show" for students from a local college, while in the power demonstration room preparations were being made for a week's display of commercial baking ovens. Further, in a workshop specially equipped for rapidly effecting repairs operatives were at work on domestic appliances. Even in the load-dispatching and control room the idea of quick service is expressed by the provision of means to divide the telephone circuits on each control desk between two operatives and inter-switching between the desks at busy periods or in an emergency.



Plant in the quarry of the Ryton Gravel Co., Ltd., showing the sub-station on the left under the gangway. The motors include those for screens and elevator (35 h.p.), Cubitt crusher (25 h.p.), Ord Maddison crusher (25 h.p.), sand filter (5 h.p.), and water pumps (20, 7½ and 5 h.p.)

An indication of the breadth of outlook required by the modern load-builder is the well-stocked radio showroom (over 500 sets were sold by the N.E.S. Co. last year). Like the refrigerator, the all-mains set, with its mere 40 W to 70 W loading, is regarded as an important builder by weight of numbers. In some respects Carliol House reminded us of the large electrical wholesalers' warehouse—the bustle in the basement storerooms for instance, and the loading of vans for dispatch to any of the twenty-five branch showrooms, including seven new ones. We saw one of these at Chester-le-Street. In principle, it is a miniature Carliol House, with its demonstration room, pay counter, stores and engineers' and salesmen's offices. It was at this showroom, in an essentially "free-coal" district, that we heard how the authorities had been persuaded to install wash-boilers with three-pin plugs in the houses on two estates, so that the subsequent breakfast cooker could be supplied from the same "outlet."

Where the introduction of public lighting to a village is an essential feature of the development of the general supply, 80 per cent. of the possible consumers are usually obtained

right away. Here, again, is the idea of service behind the development, and initial surveying as well as the preparation of an efficient proposed lay-out are both all-important. There is a special aspect of public lighting, however; the company is inclined to regard it more particularly from the point of view of advertising value. Better public lighting leads to better shop lighting. The greatest difficulty, we were told, is capital cost, and in this connection it is sometimes necessary to assist the local authorities by hiring the installations as a means of overcoming the tedious and lengthy business of obtaining consents for loans. Ownership of the installation by the local authority is regarded as the proper arrangement. The sliding-scale principle of charging for public lighting consumptions leads to the adoption of higher-wattage lamps. Discharge lighting is looked upon with favour, and we were told that its recent adoption on the main Durham Road has had the happy result of decreased road accidents.

Of particular interest in connection with a new bus station at Consett is the "Osira" lighting unit surmounting the clock; this has obviated the need for erecting a separate standard at this point. The clock has a synchronous movement and is controlled from the 50-cycle supply mains. As part of a scheme of general improvement thirty-one "Osira" lamps have been erected in the main streets radiating from the bus station. The lanterns are mounted at a height of 25 ft. above ground on existing low-voltage network poles, the average spacing of the lamps being approximately 172 ft., and the general effect has received very favourable comment from residents and bus drivers alike.

Electricity in Agriculture

Rural electrification is important. Something like £500,000 has been spent on this work in recent years in the N.E. area, where there is a progressive agricultural expert in Mr. H. D. Phelps, whose advice is appreciated by farmers. He, too, surveys and plans, besides giving consulting service. Out of, say, 6,000 "possibles," there are about 700 farms connected, representing 700 kW of motors and 450 kW of heating and lighting. We were able to inspect three representative farms, one belonging to Mr. J. W. Frater at Shilbottle, where we saw how chicks are cared for in three stages of electrical brooding from one day to eight weeks old. There is also on this farm a 15-h.p. group drive for a threshing machine, a grist mill, a chaff cutter and a saw.

On the farm of Mr. G. Reay at East Brunton we saw the part that electricity plays in feeding and dairy farming. A 15-h.p. motor serving a grinder, crusher and cake-breaker has ousted an oil-engine. In Mr. J. A. C. Davies's cow-byre we saw a 1-h.p. motor-driven vacuum pump serving a milking line for thirty-two cows. Considerable use is also made of domestic apparatus in the farmhouses. Keeping the overhead wires between the various farm buildings horizontal helps to make them inconspicuous, but what impressed us more was the very neat lay-out of the supply point equipments for the larger farms, indicating the excellent co-operation which exists between supplier and contractor. Farmers, singly and in groups, and many country residents throughout the area, contribute anything from 30s. to £2,000 towards the cost of their supply lines and transforming apparatus.

Returning Prosperity

There are signs that the progress of electrification is helping to re-start the pre-depression movement to bring industry to the countryside. We heard of new rural flour mills, and bacon and prepared-milk factories. Also, there is that essentially rural industry, quarrying. Indeed, in some cases the development of a quarry supply has been wholly responsible for the general electrical development of a locality which could not otherwise have been an economic proposition. In this field also the commercial survey is the essential initial move to any supply proposition. Notification of a new quarry or firm, even if only by a hint, results in an approach by the undertaking.

Hand-dressing of stone (masoning) is definitely going out of favour, with a consequent increase in machine-dressing at the actual quarry, where the prepared stones of required shapes are marked, numbered and transported ready for placing straight into position in the buildings for which they are specifically ordered. In this, the N.E.S. Co. is alive to future possibilities, for at any sizable sandstone quarry the cranes, compressors, saws and plane-driving machines may be responsible for the installation of from 300 to 400 h.p. Another outlet in this field is the sand and gravel quarry, where continuous 24-hour pumping is required to obtain the washed gravel demanded by progressive architects. Furthermore, the residue from the washing plant is a commercial product. Up to 30 h.p. is required for a washing machine, while conveyors, elevators, crushers, granulators, and screens result in a total of about 150 h.p. for a normal-sized quarry.

The whinstone quarries of the moorlands provide excellent material for road making. The rock is hard and tar adheres well. From 300 to 1,000 h.p. is installed at each of these quarries, but what is of outstanding interest is the latest development by way of electric tar-heating as we saw it done at one of the quarries so equipped in Northumberland. After being crushed and graded at various stages during its transport from the rock face to the mixing plant, the crushed stone is mixed with tar fed from a tank whose contents are maintained constantly at 170 deg. F. by thermosatically controlled heaters. There are twenty-one 3.4-kW elements, and the temperature of 2,500 gall. of tar can be raised from cold to 170 deg. F. in 12 hours.

Industrial Heating

Normally, however, the tar is received hot, and one group of three elements is sufficient to maintain the required temperature. The quarry engineer's log sheet showed a consumption of 70 kWh per night for the tar heating, and the enthusiasm with which the quarry-owner's representative spoke of the financial success of the scheme, which was reflected in the first pay sheet, leaves no doubt as to the future of the development where there is electrical enterprise. That, however, is just one of many possibilities which are awaiting the courageous electrical man. We were pleased to hear Mr. V. A. H. Clements, chief of the N.E.S. Co.'s Power Department, say that, in his opinion, industrial heating represented by far the biggest single field of electrical development, not because we have said this so many times ourselves, but because it is unusual to find the supply man who will either acknowledge or deny it.

Another new industrial heating development, about which Mr. W. Richardson, the company's industrial heating engineer, told us something, is the electrical annealing of glassware during its cooling after being moulded from the hot plastic material. This amounts to finer control of the rate of cooling than is possible by non-electrical methods, with consequent considerable financial saving to the glassware manufacturer by way of lower operating costs and less breakages.

The cooling lehr (tunnel kiln) is loaded up to about 40 kW and a test lehr, with a conveyor-belt 4 ft. wide used for very light ware, representing the very worst possible controlling proposition, showed that, for an average output of 20 tons of glassware per week, the consumption was 4.5 kWh per working hour and 7.7 kWh per hour overall, or 64 kWh per ton overall.

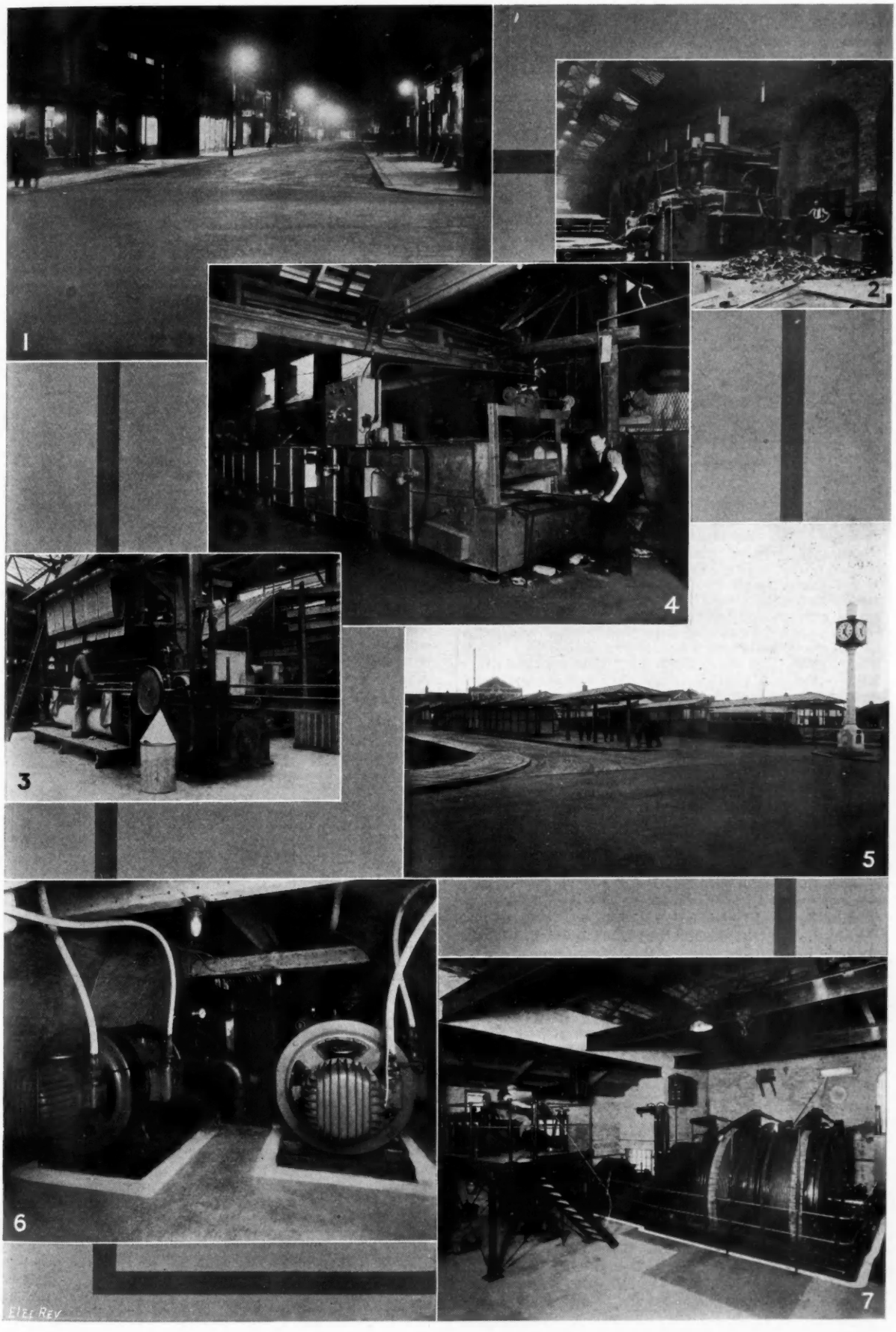
Large-scale Baking

During a visit to the South-East Durham Co-operative Bakeries at Murton we learned of the excellent possibilities of commercial baking supply by suitable day and night tariffs. The owners of large bakeries require little persuasion to reap the advantages of baking bread by night and pastry by day, and it is the knowledge that pastry is the real profit maker for the bakery which gives the live load builder a "pull." The spadework which led to securing this Murton load included a visit to a similar installation at Glasgow. The two Baker-Perkins 80-kW, double-deck ovens at Murton each have a capacity of one sack, or fourteen dozen 2-lb. loaves per deck. Thermostatic control provides independent automatic governing of the top and bottom heats, which is not possible in any sort of fuel-fired oven.

Trade recovery is preparing the way for further hard work for the load builder in connection with melting and heat-treatment furnaces. At an engineering works in the area many new furnaces for the heat-treatment of steel and brass have been installed. At the Thornaby works of Messrs. Head, Wrightson & Sons, Ltd., our expectation of seeing high-frequency furnace equipment was not fulfilled. We emphasise this because of the prevailing idea that this type of equipment is essential for the production of all special steels; the new heat-resisting steels introduced by Head, Wrightson are products of ordinary electric arc furnaces. Welding is another profitable field, and it was good to hear of the co-operation between the N.E.S. Co. and the Swan-Hunter shipbuilding organisation which has led to the considerably extended use of electric welding.

The improved outlook has been brought about largely by what is happening in the shipyards. The tonnage under construction has been more than doubled in a year, and this, with its reflection in the iron and steel trades, which are generally busier than for years, is regarded by the load-builders as beneficial to themselves inasmuch as it provided for increased purchasing power within the area.

An inquiry on our part concerning the saturation point of the industrial load brought forth a retort from Mr. Clements: "It's as far away as ever." That actually represents the general position in the supply industry, and there is no necessity to worry about saturation for many years yet.



On the North Eastern Electric Supply Company's Mains

1. Electric-discharge lighting in Consett. 2. Electrode furnace producing special steels at Head Wrightson's. 3. Electrically driven Axminster carpet loom. 4. A 40-kV annealing lehr at a Gateshead glass works. 5. Consett bus station. 6. Pumps (1,000 gal. per min.) at the Hartley Main Colliery. 7. A double clutch winder with 12-ft. dia. drums.

A new coking plant and rolling mill at Middlesbrough, representing over 3,000 kW of load, is typical of the sort of development that is going on in the Cleveland district. For instance, a brief visit to the carpet factory of Hugh Mackay & Co., Ltd., at Durham showed us just one example of the numerous small-power factories which offer a profitable field to the electricity supplier. An Axminster carpet loom is driven by a 5-h.p. motor with a four-to-one pinion reduction, and machines of this class, together with equipment for the subsequent operations of steaming, drying and shearing the carpets, all go to provide a constant load of about 50 kW. Then there are the brickworks, which provide another promising outlet for electricity. In a typical brickfield 200 to 300 h.p. is required for excavators or clay diggers, haulages, mixers, presses, fans and pumps.

An electrically operated thresher and corn crusher

Last year the new connections for supplies to large industrial works totalled about 10,000 h.p., while for small-power factories the total additional connections of 3,240 h.p. represented an increase of 13 per cent. over the new work of the previous year.

The railways provide further scope for load building. Preparations are being made for the electrification of the Newcastle to South Shields branch of the L. & N.E.R., and negotiations relating to the supply of electricity for this line have now been completed. There will be four new substations with a total of six 1,000-kW mercury-arc rectifier sets, which will be fully automatic. The plant will be controlled from the Wallsend control room of the railway company, and pilot cables for this purpose will cross the river from Wallsend *via* the N.E.S. Co.'s cable-tunnel between Carville power station and Hebburn.

Electrification of Mines

If, in the preparation of this article, we had dealt with the classes of load strictly in order of their importance in the area, we should, at an earlier stage, have given an account of the work carried out in connection with mining, for naturally, although the colliery load is already substantial, the coalfields still provide considerable scope for further electrical expansion.

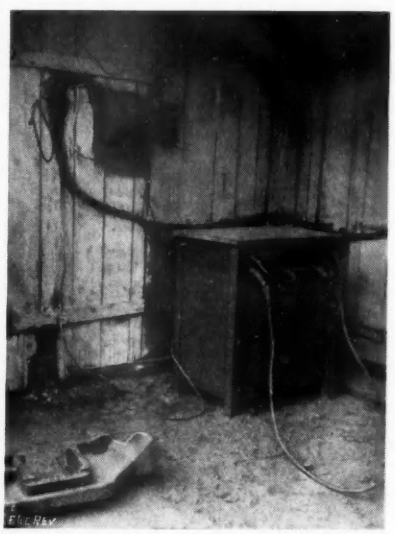
A 2,500-gal. electrically heated tar storage tank at Hare Crag Quarry

There are over 200 pits, as well as twenty-eight other colliery premises, connected to the N.E.S. Co.'s mains, and in 1935 the amount of electricity taken for coal mining purposes showed an increase of 11 per cent. on the corresponding consumption for the previous year. Mr. S. Burns, head of the company's Mines Department, told us that, a few years ago, he was persuaded by colliery friends that there was a risk of heavy financial loss resulting from what then appeared to be reckless advocacy on the part of enthusiastic electrical men in regard to coal-face installations. However, he has since changed his views as in many cases in which he has been closely interested the electrical modernisation schemes which have proved conspicuously successful are precisely those he had been warned might prove disastrous.

It is in the mines, too, that the commercial survey work stands out far and above that in any other development field, and it is commercial surveying which involves sound engineering and technical knowledge. Permission is obtained for experts to carry out exhaustive investigations at the pits and, thereafter, to prepare detailed analyses of the working costs. The next step is to obtain the colliery company's agreement to those figures. The issue of inquiries for, and in due course the ordering of, the plant required for an electrification scheme, and watching the installation of the equipment, are all part of the load-building programme.

Large Pumping Load

Mine pumping and ventilation are important services, and connected to the N.E.S. Co.'s system there is already no less than 43,500 h.p. of pump load which is responsible for raising to the surface each year 136 million tons of water (about three times the weight of the coal produced from the same pits). Again, 20,000 h.p. is employed for the fans, and this exhausts about 250 million tons of air per annum. The winder load is also of special interest in that about 130 winders are electrified. In surveying for this work, the company produces its own energy diagrams, thus ensuring that strictly comparable tenders are submitted by the various manufacturers of this class of equipment.



One of many a.c. welding transformers at the Thornaby Iron Works

The modern tendency towards greater consideration being given to the cleaning and grading of coal at the pithead provides just one more avenue for development. An excellent example of this type of installation is that at the Rising Sun Colliery, Wallsend, where the plant is designed to clean and grade 160 tons of coal per hour. In the N.E.S. Co.'s Mines Department we were reminded that an important part of the work is the retention of existing business, owing to the fact that contracts are continually expiring and colliery owners naturally seize every opportunity to improve upon their bargains if possible.

In conclusion, we have to thank Mr. H. A. Couves, general manager of the North-Eastern Electric Supply Co., Ltd., for the facilities granted in obtaining the information set out in this article, and we should like particularly to voice our gratiture to all those engineers who were so helpful in our task of getting a true picture of the intense development work throughout such a huge area within the very limited time of a few days. Our tour confirmed us in our conviction that the scope for electricity is boundless when an enthusiastic and capable staff is at work.

Safety in the Home.

By W. Lawson, M.I.E.E.

The industry's responsibility

THE question of ensuring the safe use of electricity in the home, which to the electrical man has always been more or less to the fore, is becoming one in which the general public is showing interest and some concern, and it behoves those responsible to concentrate on the problem of better safeguarding domestic consumers against the possibility of occurrence of electrical accidents.

We have to admit that there is some lack of uniformity in the attitude of electrical men as to the best practice to be observed to secure the maximum of safety; this applies even to those who are not only aware of the broad technical requirements but are also well versed in the various applicable regulations. The uncertain position of these regulations may have some bearing on the case; thus, while those issued by the Home Office are compulsory only in the factory, the I.E.E. Regulations represent merely a standard of safety, and the Electricity Commissioners' Regulations, whilst accepting them as such, do not make them compulsory. A characteristic of the Home Office Regulations is that they are accompanied by many explanatory details, but the other codes are not so explicit.

An analysis of the regulations as they affect the domestic consumer reveals that fundamentally there is very little in them which would offer much difficulty to the intelligent wireman, but in the general uncertainty as to interpretation, coupled with the small powers possessed by undertakings to enforce observance, an immense amount of shoddy installation work has been done. This side of the problem is one which undertakings could probably deal with by more rigid and more frequent inspection and possibly closer co-operation with contractors.

[*Elliott & Fry*

Mr. W. Lawson is with the Birmingham Electric Supply Dept.

If it were part of the routine of wiring inspectors to visit domestic dwellings in course of erection, then would be seen, recorded and possibly nipped in the bud, the worst work of the cheap-jack contractor which at a later stage the "Megger" is powerless to reveal. But it is essential there should exist amongst all those concerned a common understanding regarding the best methods of protection to be adopted.

The Difficult Earthing Problem

Apart from the almost negligible number of installations embodying completely the all-insulated idea there is no one method applicable to all conditions to be met with in private dwellings. Undertakings, according to the Commissioners' Regulations, have to be reasonably satisfied that the consumers' apparatus is constructed, installed and protected so as to prevent danger. Notwithstanding that the I.E.E. Regulations are deemed to fulfil the requirements, the position is unsatisfactory, and the I.M.E.A. and contractors might get down to the task of drawing up schemes for model installations based on the I.E.E. Regulations assisted by a certain amount of research into the electrical conditions that obtain in domestic dwellings and analyses of the causes of accidents.

The central problem here is the protection of portable apparatus in the extremely varied nature of the earth conditions to be met with, some of which make the value of some forms of protection more than doubtful; for instance, the earthing of the frame of an open-type electric fire when used in earth-free surroundings may introduce a danger, and has, in fact, led to a fatality.

One solution which has been put forward and should be given the utmost consideration is the use of three-pin plugs and sockets as a standard throughout an installation with the provision that in the absence of any conducting floor or object in contact with earth the earth contact-tube of the socket-outlet shall not be connected to the earthing system. This would ensure against the possibility of bringing, say, to the breakfast table, through the medium of an electric toaster, the perfect earth condition associated with bathrooms and sculleries.

In many situations earthing is undeniably the right practice, but it should be borne in mind that earthing is a safeguard against breakdown of the insulation, a safeguard, however, that is equally vulnerable and may itself become defective before being called upon to function. The two fundamental requirements are reliability of the insulation and inaccessibility of the live conductors. No insulating material should be employed in any appliance or any part of the installation that cannot resist unchanged all possible conditions, atmospheric and otherwise. Complete inaccessibility is not always attainable, as in appliances with open type heating elements, but maximum protection in this sense should always be the aim of the designer. Those who have studied the causes of electrical fatalities will agree that the majority were preventable, some by proper installation but a great many by proper use of the apparatus.

The consumer has his remedy in refusing to employ any other than a properly authorised wiring contractor to carry out the installation work and in refraining from improperly using his apparatus or coupling up additional appliances by unorthodox means. The average consumer, however, is ignorant of these requirements and it is certainly high time that he was enlightened.

Hints to Householders

The Home Office has recently published a useful pamphlet on "Fire Protection Hints to Householders," which includes some very necessary and admirably worded information concerning fires arising from the use of electricity. The value of these would be greatly enhanced if supplemented by hints regarding other electrical risks in similarly simple language somewhat on the following lines:—

The Electrical Installation should be installed by a fairly qualified electrical contractor so that the householder can be assured that electrical apparatus, particularly in the bathroom, scullery, garage or outbuildings, or where water or gas pipes are in close proximity, are efficiently earthed in accordance with standard safety requirements. Additions or alterations to the installation should not be made without the approval of the supply undertaking and should be carried out by a fully qualified contractor.

Portable Apparatus of any kind should not be used in the bathroom.

Switches and Lampholders should be made of bakelite or some similar insulating material rather than of metal.

Flexible Cords should never be of inferior quality and should be replaced as soon as they start to fray or show signs of wear. Long lengths of flexible cord, especially as substitutes for permanent wiring, are particularly inadvisable.

Radio Apparatus should be of a safe type and connected to the supply in such a manner that it can be readily and entirely disconnected when not in use. Home-made sets, unless made and connected up by or under the supervision of a competent person, may be a possible source of danger.

Outdoor Aerials should not be put directly over or under power lines.

A great deal has been made of the risk which the public is encouraging by the purchase of cheap electrical appliances and accessories, but experience goes to show that this may be exaggerated; such goods are not necessarily dangerous because they are cheap, and I have encountered some quite expensive examples of apparatus very badly designed from the safety point of view.

Testing and Certifying of Appliances

This naturally leads up to the question of whether a proving house for electrical apparatus should be instituted. As one who has had extensive experience of testing and critically examining some hundreds of samples of domestic appliances, I certainly think it would be of advantage, at the same time rather dreading the drag on development which might result from official inertia and red tape. One hesitates to press for such a scheme as, if it is to be established by means of legislation, presumably it will be preceded by the inevitable committee of inquiry during whose sittings the efforts of those who are now striving to improve matters will be relaxed and, in the general feeling of temporary relief from responsibility, the subject quietly dropped.

In the meantime the responsibility of the industry is a real one. Supply undertakings can to some extent deal with this aspect of the matter by refusing to admit to their showrooms any appliance regarding which they have not satisfied themselves after examination that it can be used with safety. They might also adopt the measure of inserting in all their specifications relating to domestic appliances a clause to the effect that the appliance must be so designed and constructed as to ensure complete immunity from danger, either when in actual operation or when being cleaned. Those undertakings who have complete facilities for the testing and examining of appliances might seek powers to issue certificates of approval valid at least in their own areas. This last is a suggestion only and I do not venture to say that such powers are obtainable, but the move would at least prove the undertakings to be in earnest.

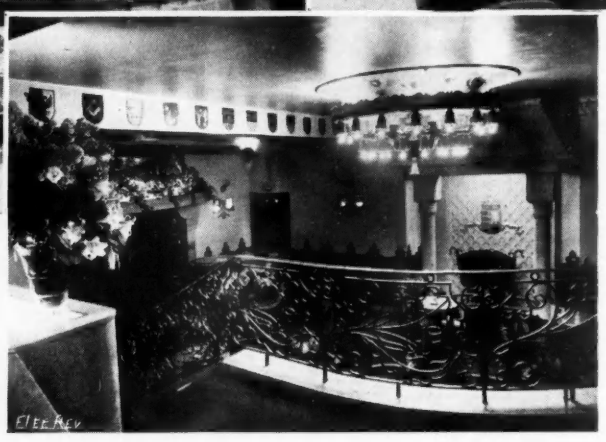
In this connection it would be as well to mention that the

industrial research laboratories of the Birmingham Gas Department are authorised to issue certificates of results in important classes of testing and have their own test mark registered by the Board of Trade for use in connection with the certification of results of tests. Are there no municipal electrical testing departments with equal claims to such confidence in their competence to issue certificates of results in similar circumstances, and in particular with regard to electrical appliances in common use by consumers? There can be only one answer to such a question.

Modernising London Restaurants

TWO of London's most popular restaurants, Quaglino's in Bury Street and the Hungaria in Lower Regent Street, have recently been redecorated, the lighting installations modernised and air-conditioning systems installed.

Carved wood lighting fittings in green, red, yellow and silver to harmonise with the mural decorations and furniture, give the Hungaria a traditionally national appearance, which is emphasised by illuminated shields let into the walls. The trunking for the Jeffreys air-conditioning system has been ingeniously utilised for housing loudspeakers and for recessing lighting fittings fitted with revolving colour changers. White tubular lamps are hidden in the edge of the trunking, while the colour of the concealed cornice lighting round the outer walls can be changed from white to flame by means of G.E.C. dimmers. Spotlights, also dimmer controlled, are focused on baskets of flowers. A twenty-point Ardente installation permits microphones to be used in any part of the restaurant.



The top right-hand picture shows how Quaglino's Restaurant looks after redecorations. The other illustrations are of the restaurant and cocktail bar at the Hungaria

Downstairs in the cocktail bar adjoining the grill-room an impression of comfort and warmth is produced by a huge imitation wrought-iron brazier. This room is also carried out in true Slavonic style, a unique feature being a central pendant lighting fitting made up of two concentric circles of sixteen lamps surrounding a revolving group of model figures in national costume; a rim of concealed lights surmounts the fitting. On one of the walls is an illuminated electric clock with a floral design. The main lighting of the grill-room itself comes from attractive pendant and wall bracket fittings. The electrical contractors were Messrs. H. Page & Sons.

The alterations at Quaglino's have involved the removal of the ceiling pendants and the substitution of a three-colour concealed trough lighting system (G.E.C.) controlled by fourteen Mickelwright dimmers. In this building, too, the trunking of the Jeffreys air-conditioning plant is employed to house hidden electric lamps. At one end of the restaurant is a Venreco cyclorama depicting a Swiss scene, while imitation windows at the other end are flooded with coloured lights. On the walls are lighting fittings by Troughton & Young, Ltd. The new installation was carried out by District Electric, Ltd.

The Brighton Transport Congress

THE members of the Tramways, Light Railways and Transport Association spent two busy days at Brighton on June 11th and 12th, the occasion of their twenty-sixth annual congress. The programme included two business sessions, the annual dinner of the Association, a reception by the Mayor and members of the Brighton Corporation at the Royal Pavilion, excursions to Arundel and Worthing and to Eastbourne and Beachy Head, and a visit to the works of Messrs. Allen West & Co., Ltd., at Brighton. On the Wednesday evening preceding the meeting there was an informal reception at the Hotel Metropole, Brighton, by Mr. T. E. Thomas (chairman of the Council). The President (Sir Arthur Stanley, G.B.E., C.B., M.V.O.) was unable to attend the business sessions of the Association owing to his Parliamentary duties; but he was able to visit Brighton in order to preside at the annual dinner. Mr. Thomas took the chair at the business sessions.

The Mayor of Brighton (Councillor Edward Denne, J.P.) extended a hearty welcome to the members when they met for their first session at the Hotel Metropole on Thursday morning.

Mr. Thomas, presenting the report and accounts for the year ended December 31st, 1935, at the annual meeting, said that the year had been comparatively peaceful as compared with previous years, and the Council's activities had been concerned mainly with the development of the trolley-vehicle side of the Association. With regard to wear and tear allowance for depreciation of trolley-vehicles, he said that the Association, in co-operation with the other bodies concerned, were able to come to an agreement with the Inland Revenue authorities whereby the prevailing rate of depreciation of 15 per cent. on the written-down value of the vehicles was continued for a further five years.

Negotiations with regard to carrying out certain rules and regulations under the Road Traffic Acts of 1930 and 1934 were continued during the year. As a matter of equity, the Association contended there should be some appreciable relief granted from the present burden of excise duty payable in respect of tower wagons under the Finance Act, 1935.

A committee of the Council, with representatives of other associations and officials of the G.P.O., were considering what steps could usefully be taken with a view to the settlement of claims for damage alleged to be caused by tramways to Post Office cables. It was confidently expected that some mutually satisfactory arrangement would be arrived at. The accounts again showed a small balance on the right side.

As we mentioned last week, two papers were read and discussed—"Some Aspects of Trolley-Bus Development," by Mr. A. T. Priddle, and "Merchandising Passenger Transportation," by Mr. A. A. Jackson.

The Edinburgh Discussions

Views on water heating, large-scale cooking and street lighting at the I.M.E.A. Convention

In our special issue last week we published abstracts of the three papers read at the I.M.E.A. Convention, Edinburgh. These evoked interesting and useful discussions, the main points of which are brought out in the following reports.

Electric Water Heating

IN opening the discussion on Mr. G. H. Lake's paper on this subject, Mr. F. NEWEY (Lincoln) remarked that the paper was indicative of the great change which was coming over the industry. A few years ago the whole of the time at the convention was devoted to engineering problems; then there was a phase dealing with distribution; but nowadays leading engineers devoted much of their time to the development of domestic water heating, a section of the work which had been viewed with scorn by many of the earlier members of the profession. If the form of application which Mr. Lake required consumers to sign when they wanted a water heater installed were as simple as the form reproduced in the paper, asking for extra wiring, he had set a lead to many engineers.

In a city such as Lincoln, where many of the old houses had great lengths of water pipes, the installation of a circulator in the ordinary hot-water system resulted in the wasting of a great deal of heat, due to the water being left in the pipes. Thus, consumers became dissatisfied, and it was better to reject an application rather than to displease a consumer; it was better still to recommend a storage-type heater. Referring to the fact that at Nottingham the sales per consumer had increased by 1,200 kWh per annum where water heaters were installed, Mr. Newey pointed out that, at ½d. per kWh, that meant a revenue of 50s. per annum, which was quite reasonable. At Lincoln the consumption per water heater was about 800 kWh per annum. The value of the load was very great because of its very high diversity; moreover, due to the circulator being installed in the hot-water system, very little use was made of it during the winter months; for that reason the installation of a change-over switch had been discontinued.

Although a thermostat increased the cost it constituted a safety valve; he fitted a thermostat to each circulator as a protection against the consumer failing to operate the switch; further, if a consumer had a bath in the evening, the thermostat would take care of the temperature of the water during the night. The equated rate at Lincoln embodied a cooker and/or a water heater of the 1½-gallon type. The fitting of a 1½-gallon water heater over the sink, even in the poorer dwellings, had proved a great asset to the undertaking and a very great convenience to consumers. It was a means of "putting over" the electrical idea, and led to the installation of cookers. At Lincoln approximately 1,000 such water heaters had been installed during the last fifteen months.

Experience at West Ham

Mr. J. W. J. TOWNLEY (West Ham) said he could not imagine anything more unsatisfactory than to tell a consumer that a splendid system of water heating was available, but that it did not suit the particular arrangements of his house.

At West Ham, where a very large number of old houses had been converted into flats, so that each house accommodated three or even four families, it was impracticable to apply the circulator system to the existing hot-water systems; the storage-water heater was the only possible solution. In this area there were many large families, and if water heating were dealt with through the ordinary prepayment meters it would be found that the kWh supplied for the penny or the shilling would run out while the heater was doing its work. Therefore, he supplied a 1½-gallon water heater for 1s. per week, which sum included the electricity used, the hire and maintenance of the installation and the necessary plumbing. That gave a return, on an average, of from 0.25d. to 0.27d. per kWh, and the scheme was one which he believed would be very satisfactory indeed for a large proportion of the poorer classes of the country.

Mr. A. G. COOPER (Thornton Cleveleys) said that he had commenced to encourage the use of water-heating appliances in April, 1933, by the hire of "Santon" belts at 2s. per quarter each and 3s. for two belts, inclusive of wiring and fixing. He was not very strict on a wiring limit. By April, 1934, there were about 110 installations, and he then concluded that the circulator immersion heater, undoubtedly a more efficient installation, was a practicable proposition at a hire charge of 2s. 9d. per quarter, inclusive of all plumbing and wiring, and that manual operation offered the greatest advantages at the time. On launching the scheme for hiring the immersion heaters the hire charges for belts were reduced to 1s. 6d. and 2s. 3d. respectively in order that there should not be an influx of returns; to date there had been no more than six changes, some people preferring them to immersion heaters. At the same time a scheme was tried for hiring self-contained thermal-storage tanks, ranging in price from 3s. 6d. per quarter, again including all plumbing and wiring; but, with the exception of hairdressing establishments, that business had been very unsatisfactory and the returns of apparatus frequent.

Two years ago his chief assistant began experimenting with a new design of circulator, endeavouring to combine the advantages of the belt and the thermostatic immersion circulator, the radiation loss of which was an economical figure. (An article on the subject was published in the ELECTRICAL REVIEW of April 26th, 1935, and this type of heater is being sold by a Scottish firm of water-heater manufacturers.) From a practical test of one of the special-design circulators, installed in a private house accommodating a family of five, all adults, the approximate consumption was: ½ kWh per day with the fire burning all day; 2 to 3 kWh per day when the fire was burning for half of the day; 5 to 6 kWh per day when the fire was not lighted at all; and 6 to 9 kWh per day when the fire was not lighted at all and extra water was used for baths, &c. The circulators were hired out at 3s. 6d. per quarter, including all plumbing and wiring, together with the supplying and fixing of a lagging jacket; fifty-two had been installed since January. Altogether, there were 701 water-heating installations in Thornton Cleveleys out of a possible 3,200 domestic installations.

Ten Thousand at Wimbledon

Mr. A. E. MCKENZIE (Wimbledon), who has been chairman of the E.D.A. Water Heating Committee since its inception ten years ago, and is also chairman of the B.E.A.M.A. Water Heating Committee, did not agree with concentration on one particular form of water heater. In the Wimbledon area there were 10,000 water heaters installed, and he believed that every known type was used. There was one water heater for every 3.7 houses in the area, and they were being installed at the rate of more than 100 per week. He could not think that the circulator used at Nottingham could give satisfaction, for Mr. Lake had advocated that the storage cylinder should not be lagged; that meant that, in the interests of economy, one could not keep the heater on all day. Consequently, one had to anticipate the hot-water requirements. His view was that, whether one employed circulators or plain immersion heaters in the storage tanks, the tanks should not be at a higher temperature than about 140 deg. Further, he believed that with every cooker a throw-over switch and a 1½-gallon water heater should be connected, as in his area.

Installation costs at Nottingham were high; he had trained his own installation men. One man and an apprentice dealt with the tank, altered the pipe work where necessary, and put in the wiring and the meter; all that remained was for a superior type of man to test the installation electrically and to see that the mechanical arrangements were satisfactory. Thus, the costs of installation were reduced tremendously.

A 2,000 Million kWh Consumption

Mr. P. CLEGG (Morecambe) prophesied that water heating would lead eventually to an annual consumption of more than 2,000 million kWh, plus the probability of that consumption being doubled in industrial and commercial establishments. The water-heating demand was one of the finest load levellers ever put forward, and in his own personal experience he had never known any other electrical appliances give more general satisfaction to every member of the household. His own undertaking had connected 90 per cent. of possible consumers, and had a water-heater installed in one in every five households. Consumers should have the choice of either manual or thermostatic control. He had found it beneficial to fit a switch in the kitchen where automatically controlled circulators were used, so that during the day, if the fire-back boiler were alight, the consumer could switch off; during the winter the consumer switched on at night so that hot water would be available in the morning. The number of premises where more than 40 ft. of cable was required was so small that it was not worth the trouble (and annoyance to the consumer) involved in making an extra charge.

Councillor H. A. SALE (Birmingham) suggested that with larger installations it was preferable, from the point of view of the consumer, to meter the water-heater supply separately. Then, if it were a satisfactory system, such as his own, it

would prove to be the best advertisement for electric water-heating.

Councillor Mrs. J. ROBERTS (vice-convener of the Glasgow Electricity Committee) regarded manually controlled water-heating as unsuitable in the home. Electricity was cheap to use, but expensive to waste, and the housewife preferred thermostatic control because it prevented waste. It was high time that there were more women on electricity committees.

Mr. LAKE, in a brief reply, said that he was catering for only one particular type, but consumers could have any other water-heater on hire-purchase terms if they desired. Manually controlled apparatus was found to be the cheaper to run.

* * *

Large-scale Electric Cooking

MR. S. C. HURRY, in presenting the paper of which he was joint author with Mr. W. E. Swales, said that the total consumption for large-scale cooking in the United Kingdom was probably still below 1 per cent. of the 13,000 million kWh sold for all purposes in 1935. Yet, if the use of electricity for domestic cooking could be developed at the astonishing rate recorded in recent years, there seemed to be a *prima facie* case for equally rapid progress in large-scale cooking. He exhibited lantern slides of heavy-duty electric cooking equipment, and said that at the electrical exhibition held in Edinburgh during the Convention week inquiries had been made by members of committees who were interested in hospital equipment, and by restaurant proprietors.

The first speaker in the discussion, MR. E. E. HOADLEY (Maidstone), emphasised that a very large market existed already for the sale of electrical energy for heavy-duty cooking. Two reasons why this description of cooking had not made much greater strides than it had were, first, want of knowledge on the part of potential users, and secondly, vested interests; on the boards of many institutions there were gentlemen who were not interested in electrical methods of cooking because they were interested in something else! The peculiar conditions applicable to each case must be thoroughly studied and understood. After referring to installations in Maidstone which had been giving very good results for a number of years, he said he had recently obtained an order for an all-electric kitchen for a hospital. Fortunately, there had been sufficient money available to enable him to make a good job of the installation, and it was one of the best and most up-to-date that could be provided in the present state of our knowledge. Accurate records there showed that the cost of preparation of the food, from the time the raw materials were delivered to the kitchen until the food was consumed, was almost exactly half a unit per person per day; that included the current consumed by cutting, slicing and mixing machines, the cooking of the food, and heating cupboards and trolleys. The hospital authorities were exceedingly satisfied with the results.

Specialist Advisers

The cooking load could be obtained on the score of price alone in 99.5 per cent. of the towns of this country at a perfectly economic rate, *i.e.*, a rate which would return to the supply undertaking a fair profit. Finally, he urged that E.D.A. should extend its recently adopted policy of maintaining on its staff specialist engineers in cooking apparatus and other fields, who should be made available to individual undertakings.

MR. J. W. J. TOWNLEY acknowledged the assistance the paper had given him a short time ago in connection with the proceedings before a Select Committee of the House of Commons which was considering a Bill promoted by the Gas Light & Coke Company. The Committee was surprised to find that the development of electric cooking had extended so far as it had.

Mr. Townley emphasised the necessity for removing the impression from the minds of many people that electric cooking was new, particularly in connection with institution work. Mr. Townley suggested that a copy of the paper be sent to all engineering inspectors at the Ministry of Health, who were very fair-minded people, to convince them that electrical equipment would do at least the duty performed by gas equipment, and for the same cost. He emphasised the importance of the lay-out of kitchens; it would not do merely to install the apparatus in any old room which was available for the purpose. Supply engineers should collaborate with manufacturers in developing the cooking business, but the idea of asking a particular manufacturer to submit a scheme was entirely wrong. Supply engineers must have specialist officers for the large-scale cooking business.

Largely an Off-peak Load

MR. W. A. GILLOTT (English Electric Co.) stressed the fact that the cooking load was largely off-peak, and that the portion which came on the peak had an extraordinarily high load factor. Therefore, an economic tariff would give a good return. He urged that supply engineers should endeavour to have restaurant equipment so installed that the public entering the restaurants could see it.

As showing the value of proper service after sales, Mr. Gillott said that some time ago he had equipped a kitchen with about 150 kW of apparatus for a catering company. At first the proprietors declined the services of a trained demonstrator, and as a result during the first week the consumption was 120 per cent. above Mr. Gillott's estimate, and during the second week 150 per cent. above. A demonstrator then attended and during the first week the consumption was reduced by 33 per cent., by the end of the second week it was reduced by a further 25 per cent., and by the end of the third week it was reduced to the original estimate. The savings in the cost of decoration and by the conservation of fat were very considerable.

MR. O. C. WAYGOOD (chief engineer, Lewis's, Ltd.), whose testimonial to large-scale electric cooking had been referred to in the paper, said there was much to be learned from the gas engineers. Electrical people should concentrate on the selling of electric kitchens rather than appliances. He had to keep an open mind upon this subject; but having had experience of other media, he had not the slightest doubt that the electrical kitchen, provided it was sensibly equipped and that the price of electricity was right, would serve the catering trade just as well as, if not better than, any other type of kitchen. He asked the manufacturers if they were quite satisfied that their apparatus was right—whether they had associated themselves with the catering trade to the extent that they could meet the demands of that trade, especially in design and loading. Of course, he might be wrong, but manufacturers seemed to be rather nervous about introducing the heavy loadings which were desirable.

In the electrical kitchens of his company in Glasgow, which had operated for four years, the maintenance costs had been negligible.

MR. H. W. CLOTHIER (A. Reyrolle & Co., Ltd.) pointed out that in view of increasing loads and, therefore, increasing power, greater consideration must be given to dividing the power supply in order to deal with the problem of short-circuits when they arose on the apparatus and the system. The size of protective apparatus was not to be gauged by the size of the load-consuming device, but rather by the amount of power behind the device. As an example of sectionalising and voltage selection with the use of modern equipment rated on test-plant performances, a rough and ready rule was to so divide the connections that there was not more than 2,000 A per phase per section. When the demand seemed to require circuit-breakers in excess of that current rating, it was time to make a revision at a higher voltage. Beyond that rule, design inconveniences were reached and considerations of economy were exceeded, particularly if the reactances of the circuits were such that the vicinity short-circuit exceeded a symmetrical r.m.s. current of 40,000 amperes, or its complement 100,000 maximum peak amperes, in power station and main networks.

MR. W. P. LILWALL (Fleetwood), who suggested that in the discussion the difficulties had been over-emphasised, said that at Fleetwood there were ten or twelve places with more than 20 kW of cooking, and at least three with more than 150 kW. The average architect knew very little more about the lay-out of kitchens than did the electrical engineer, but with the aid of a little common sense and a good chef there was nothing to be afraid of.

Outstanding Examples

MR. SWALE, replying to the discussion, emphasised the importance of news items as a means of arousing the interest of those initially apathetic. For instance, one could refer to the new cooking installation on the *Queen Mary* and at the Zoo. Again, the Metropolitan-Vickers Co. had recently opened an electric canteen which was cooking more than 1,000 lunches daily; the new refectory at Manchester University was being equipped with a steam-electric kitchen to deal ultimately with between 1,200 and 1,500 lunches daily; while at the Royal Show, Bristol, to be held in July, there would be over 1,000 kW of electric cooking appliances which would provide meals for nearly 100,000 people.

Commenting on Mr. Gillott's reference to the balancing of the load, he said that one could balance theoretically when a kitchens in the country having more than 15 kW of apparatus. balance when the apparatus was being used; it was essential to know the cooking routine before deciding on the balancing of appliances; many of the appliances were on for a good many hours before luncheons were served. Replying to Mr. Way-

good, he said that in country districts there were kitchens using electricity at 1d. per unit, and they were giving complete satisfaction. Kitchens using electricity at the higher rates of charge were in many cases working more efficiently than those using electricity at lower charges. It was hoped within a short time to complete a national census of all kitchens in the country having more than 15 kW of electrical apparatus.

He hoped the discussion would be followed by local discussions at E.D.A. centres (already there had been two), and that local exhibitions of heavy-duty appliances would follow. Another suggestion was that four or five years hence the I.M.E.A. should arrange for another paper to be presented in order to review the progress made.

MR. P. J. ROBINSON (Liverpool), proposing a vote of thanks to the authors, said that a very large club in Liverpool had been working entirely electrically for five years; it was cooking 200-250 meals per day, and he was informed that during the last two years no maintenance costs whatever had been incurred.

Electric Street Lighting

THE first speaker on the paper on this subject by Messrs. P. J. Robinson and J. N. Waite was Mr. W. J. JONES (E.L.M.A.), who emphasised that since the beginning of this year there had been no fewer than 50,000 accidents on the roads, of which 1,500 were fatal, and that many of them could have been avoided by installing the kind of lighting recommended in the paper. He believed that as a direct result of the information given in a similar paper presented to the I.M.E.A. two or three years ago the electrical industry had been able to obtain about 3,000 miles of extra street lighting.

Mr. Jones pointed out that there was also a sound economic basis for changing over the whole of the street lighting of the country to electrical operation. He had estimated that, with the 800,000 street-lighting posts in this country, if the whole of the lighting were electrical, there would be provided at least 100 per cent. more light, and the public would not be put to any additional expenditure. There were between 10,000 and 12,000 electric-discharge lamps in use in our streets, and they had been adopted by no fewer than 170 public lighting authorities.

Mr. G. H. WILSON (G.E.C.) said that the electric-discharge lamps had rendered possible installations of a calibre which would have been quite impossible, for a given cost, with the older types of electric lamp, and present research work held out even greater promise for the future; particularly was that the case in connection with the mercury lamps, for research indicated that efficiencies would probably be increased, the form of the light source would be improved, and one could expect that the light would be made whiter.

Discussing the use of the hooded and non-hooded units, he said he had examined the two installations described in the paper. In the installation using hooded units, the minimum value of the lighting across the dark parts was 0.07 ft. candles, and the maximum in the bright parts was 0.15. In another installation, in which the units were not hooded, the minimum brightness was 0.15 and the effective brightness in the carriageway was about 1.5.

The two installations cost about the same per mile, but the brightness in the non-hooded installation was about ten times that of the hooded type. Even if one accepted the figure the Americans gave for the deleterious effect of the unshielded sources—and the data obtained in this country gave a reverse indication—and decreased the brightness figure for the second installation by 50 per cent., that installation still gave figures showing five times the value of the first installation.

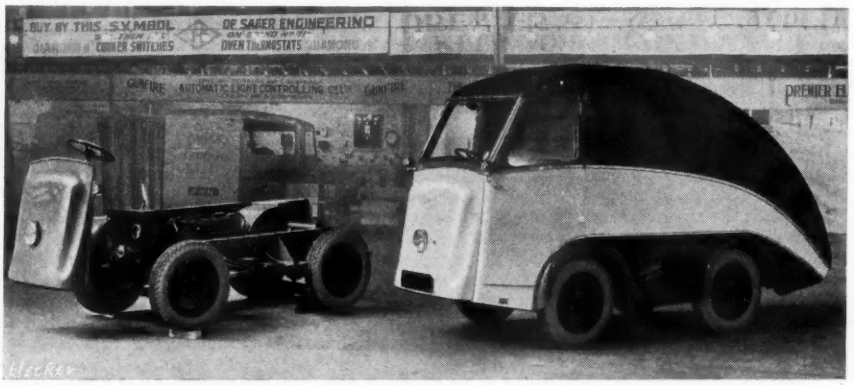
MR. E. E. HOADLEY said that the objections expressed by the public to the monochromatic light from electric-discharge lamps were being overcome. Lighting by sodium-discharge lamps was practically perfect, and he believed that, for fundamental reasons, the efficiency of sodium lighting was at its maximum, but that mercury lighting was only just beginning to be developed. Partly for that reason he would like to see a comparison between a sodium-lamp installation and a similar mercury-lamp installation. Finally, he asked what was the best that could be done in the lighting of side streets, bearing in mind financial considerations.

Mr. L. ROMERO (Salford) said that a great advantage of filament electric lamps as compared with gas lighting was the warmer and more cheerful colour of the light, and although he agreed that the future of street lighting would be almost certainly with the discharge lamps, he felt that further improvement of the colour of the light was due before they could be adopted generally as a desirable substitute for metal-filament lamps.

FALK, STADELMANN & Co. LTD
Branches VERITAS HOUSE, CLYDE STREET, GLASGOW
SCIENTIFIC HOLOPHANE LTD ILLUMINATION
ELVERTON ST. VINCENT SQ. LONDON S.W.1
COOKERS
Elec Rev

Four of the principal stands at the I.M.E.A. Exhibition, Edinburgh

Mr. H. MIDGLEY (Plymouth) appealed for the development of a standard, which would be acceptable to both gas and electrical interests, based on visibility, which, after all, was the test of the lighting. The gas industry insisted on the British Standard Specification, which fact placed the electrical industry at a disadvantage. He also pleaded that there should be co-operation nationally with road surveyors concerning types of road surfaces. He felt that it was not beyond the skill of the manufacturers to produce discharge lighting giving the lighting given by electric-discharge lamps, to introduce into the fitting, in the first place, three 100-W lamps of the ordinary gasfilled type, thus taking advantage of the red rays to give a certain amount of colour correction. These could gradually be reduced in size and number until only the discharge lighting was left. He asked if the authors had experimented, or knew of experiments, in the colouring of road surfaces, using sodium, mercury and filament-lamp lighting respectively, and, if so, what conclusions had been arrived at.



A Metrovick electric vehicle and chassis shown at the I.M.E.A. Exhibition (See p. 907)

Mr. WAITE, replying to the discussion, said the authors were somewhat disappointed that no committee men had discussed the paper, for they had wished to appeal to those who controlled the purse strings. In referring to poor lighting, the authors did not necessarily mean low values of lighting, but poor visibility; where there were alternate pools of light and darkness visibility was practically non-existent.

Replying to Mr. Romero, he said that the increased light output of the discharge lamp as compared with the filament lamp was so enormous that one could not afford to ignore it merely because of colour rendering. Although they had used the figure of 1d. per kWh for the purpose of the tables in the paper, the authors had stated that ¾d. per kWh was an economic price for practically all undertakings; and with large-size units it would pay well to provide the lighting at still lower cost. With regard to visibility the colour of the road surface did not matter a great deal; the factors which did matter were the texture of the surface and the degree of polish on it. It was far more important that a road should not be rough, from the lighting point of view, than that it should have a light colour.

If a road were of light colour a smaller amount of light was needed to ensure the provision of good visibility than if the colour were dark.

The authors had not differed on principle but only as to the best means of achieving first-class visibility on arterial roads. There were two methods open to them and each of them had tried one of those methods. In both cases first-class visibility had been achieved.

Mr. H. C. LAMB (Manchester), emphasising the authors' plea for a uniform standard of street lighting as between one area and another, pointed to the fact that in some cases the expenditure on street lighting had been reduced by one authority after comparing the costs incurred by itself and a neighbouring authority; that meant lowering the standard of lighting in one area because another area was backward. In conclusion he proposed a vote of thanks to the authors for their paper.

a result more nearly akin to daylight. Further, he asked if they could provide metal-filament lamps the life of which was not shortened so much as at present by periods of high voltage such as were liable to occur at night.

Mr. LENNOX (Association of Public Lighting Engineers) suggested that the figure of 2s. 4d. per thousand cu. ft. used by the authors as the cost of gas in comparison with electric street lighting was somewhat high. The future of efficient street lighting lay in the electric-discharge lamp. The gas undertakings had realised that, although they might be making a loss, the retention of the street lighting was more valuable than the revenue which it produced.

He asked if the authors would agree that roadway brightness was caused by the illumination coming from an angle between 90 deg. and 70 deg. from the horizontal; if so, surely the hooded reflector could not be the right type of reflector to use for ordinary lighting. The installation by Mr. Waite at Hull involved several new principles.

Mr. J. W. J. TOWNLEY said that the £18,000 or £19,000 which he was allowed for lighting an area containing 300,000 inhabitants was totally inadequate, and he emphasised the authors' suggestion that part of the cost of lighting through-roads should be borne by the national exchequer. In those circumstances he was certain his own authority would not reduce the street-lighting allocation, but would allow him to use the money to improve the lighting of the side roads.

Mr. J. K. BRYDGES (Eastbourne) said he had found it a good thing in order to overcome objections to the colour of

* * *

Annual Banquet and General Meeting

THE annual banquet and ball was held on June 11th, in George Watson's College at Colinton Road, Edinburgh. Sir Godfrey P. Collins, M.P. (Secretary of State for Scotland), was unable to be present, as he had intended, by reason of Parliamentary business. The President (Mr. Seddon), accompanied by Mrs. Seddon, received the members and guests before dinner. The President read a reply to a telegram which the Association had forwarded earlier to His Majesty the King.

The loyal toasts having been honoured, Mr. Frank Hodges (Central Electricity Board) deputising for Sir Godfrey Collins, proposed the toast of the Association.

The President, in the course of his reply, instanced as evidence of the need for combined action the effect on public utilities of the Coal Mines Act of 1930. The Government was to enforce in each district a monopoly in coal, vesting the control in the hands of the coalowners and leaving the consumer without any effective protection whatever. The policy to be followed in the district selling schemes was entirely out of keeping with the usual British sense of fair dealing, and in that respect he mentioned that within twelve months the price of coal delivered by rail to Edinburgh Corporation for use in the Portobello power station had risen by no less than 33 per cent.; yet it was possible under recent contracts for the same class of coal to be purchased and delivered long distances by road to small institutions at 6d. per ton less than that charged to the power station.

Mr. Seddon said that he believed that many industrial establishments that were de-rated (whilst the electricity undertakings were not) were able to purchase coal at a lower price than was charged to public utilities; he submitted that such a policy could only bring the coal industry into further disrepute and lead to foreign buying by large purchasers.

Sir John Brooke, C.B. (vice-chairman, Electricity Commission), proposed "The City of Edinburgh," and The Lord Provost responded. Mr. Frank Forrest (vice-president) proposed the health of the guests, for whom Lord Salvesen replied.

The President presented a cup to Mr. J. S. Pickles (Dumfries C.C.), the winner of the golf competition, as a result of which the Benevolent Fund of the I.E.E. benefited by the sum of £12. The remainder of the evening was devoted to dancing in the large hall of the college. The façade of the building was floodlighted, partly in colour.

Annual General Meeting

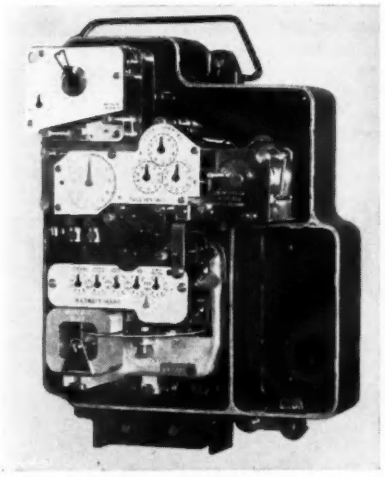
At the annual general meeting on June 12th, it was announced that the following officers had been elected for the ensuing year:—President: Mr. Frank Forrest (Birmingham); vice-president: Mr. W. J. Bache (Cheltenham); hon. treasurer: Mr. T. Roles (Bradford); and hon. secretary: Mr. E. E. Hoadley (Maidstone). The newly elected members of Council are Messrs. G. H. Lake (Nottingham), B. Handley (Portsmouth), A. Nichols Moore (Newport), P. Wardle (Cannock), and H. Wilson (Ashford), Alderman J. W. Longley (Bradford), and Councillor G. S. Gardner (Edinburgh).

Further Notes on the I.M.E.A. Exhibition

Supply, industrial and lighting equipment

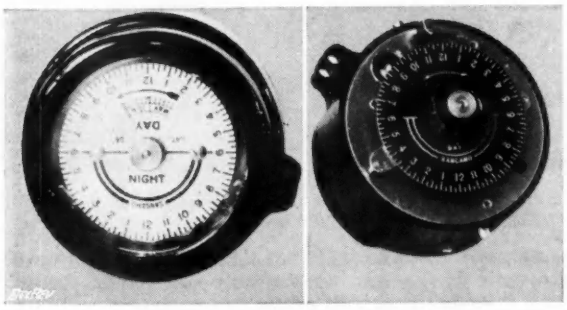
By Our Special Commissioner

UNTIL the load-factor problem is very much nearer solution the possibility of its improvement must always be one of the biggest influences in any load-building effort, and from this viewpoint I regard the latest development of the Automatic Electric Co., Ltd., as of outstanding importance. By means of a multi-facility switch and equipment selector switches the "Strowger" carrier switching system can be extended to afford remote control of water- and space-heating installations, shop-window and sign lighting, and of double-tariff meters to suit an undertaking's programme. There can be a multi-facility switch at the transmitter (for superimposing h.f. impulses over the power network), or a central facility unit can control a number of transmitters *via* pilot wires.



The mechanism of a Venner two-part tariff prepayment meter

Time control is, of course, the fundamental consideration with this scheme, which will extend still further the field of usefulness of the time-switch. It is hardly necessary to point to the increasing popularity of the synchronous - motor time-switch, but some readers may have experienced my difficulty in understanding why the electrically wound clock has continued to thrive by the side of the synchronous equipment with spring storage, without appreciable advantage in cost. Venner Time Switches, Ltd., answered this for me. The 36 hr. storage is often either not enough or is not considered sufficient by the more cautious mind. One point of Venners' appeals to me very much. The synchronous clock, by virtue of time and money saved (no winding and reduced maintenance), is giving electric street lighting a further "pull" in its competition with gas. I saw displayed by the British Sangamo Co., Ltd., a neat 10-A synchronous time-switch in a bakelite case 4 in. in diameter and 3½ in. deep. It can be provided with or without an astronomical dial and without a case as a plug-in unit for public-lighting equipment. Messrs. Ferranti, Ltd., have now entered the time-switch field with a similar compact switch.



The Sangamo bakelite case time-switch

I fear the initial cost is perhaps a reason for greater use not being made of the inherent advantages of light-sensitive equipment in street-lighting, but a new control unit in which a neon tube replaces the valve represents a considerable improvement in this connection. The tube just flashes at each operation, so that its life is practically unlimited. A small rectifier in the output renders it easily adaptable to a.c. or d.c. working. By itself this unit will control 500 W, but for a load above this figure a contactor is employed either incorporated or externally. The new model is not expected to supersede the valve equipment for laboratory work, because of its slightly slower operation.

Push-button operation is now employed much more extensively for motors, although perhaps more importance is attached to this from the aspects of accessibility and protection than from that of remote control.

Brook Motors, Ltd., commented on this point when showing me a new external starter for the larger sizes of single-phase motors. Two contactors control the starting and running windings, respectively, and the starting component has a time lag which allows the motor to attain full speed before the running winding is switched in. Push-button control is a feature of a large range of magnetic contactors introduced by Arrow Electric Switches, Ltd. They are made in sizes for up to 7½-h.p. motors and incorporate thermal tripping, but considered as a system the feature is the very wide range of push-button control stations available for remote control. Some incorporate a pilot light, and I saw one with a selector switch for use with reversing motors.

It is easy to see the result of increased competition recently in the cartridge-fuse field, and I was particularly impressed by the large variety of types and makes of fuse handles for which the English Electric Co., Ltd., has evolved successful conversion schemes for the use of its cartridges. The detecting window in the front of the handle is a good scheme, while the bus-bar type of fuse fitting which, unlocked, swivels about the circular bus-bar, makes for easy cable connecting. So, for that matter, does the swivelling connector which gives a three-inch tolerance. In an E.E. low-voltage pole-mounting fuse I should imagine that the cartridge has reduced the equipment to its simplest possible form. At the end of an operating pole the fuse is pushed home through a bell mouth to a bayonet-cap lock. A 50-lb. spring at the top ensures good contact. In the distribution pillar of this make, with its reversible lugs for eliminating phasing out, the fuse handle has a slot in the bottom contacts which engages with projections on the blade when switching in.

Radiovisor neon tube switch unit

A new industrial switch-fuse introduced by Messrs. Parmiter Hope & Sugden, Ltd., incorporates the "Aeroflex" cartridge fuse, which is designed to do the work of high rupturing capacity circuit - breakers at much lower cost. The fuses have a rupturing capacity of 35,000 kVA, and the switch-fuses are made in four sizes for 60 A to 500 A. With a straight-on parallel action the two breaks per line are afforded at really high speed *via* a lever link system and under spring influence.

A semi-circular rectifier with improved accessibility (Bruce Peebles)

A watertight switch - plug made by Santon, Ltd., has been in great demand for use in paper mills with equipment associated with the boiling of esparto grass. This apparatus, with its standard

switch and plug in an iron-clad box, and a 100-A, 440-V Arrow switch of similar construction to the small "incorporated" appliance switches of that make, are exhibition items which

Floodlight fittings ready for the Coronation (B.T.H.)

stand out in my mind as excellent engineering achievements.

Messrs. Bruce Peebles & Co., Ltd., showed me a new rectifier which has been designed specially for cinema work. Its metal housing is semi-circular, and when the segment door of each of the two compartments is open the whole of the contents, glass bulb on one side and switchgear on the other, seems to have the accessibility of complete exposure.

Close association with some of our progressive undertakings has shown me the enormous scope for street lighting in the rural areas, and for this reason I was interested in the "Ruralux" lighting fitting introduced by Benjamin Electric, Ltd. The unit is really a small edition of the "Rodalux." It takes lamps up to 150-W, fixes on existing brackets, and has a wide side to side and frontal distribution. The "Ile" fitting of the same make is designed to eliminate swan-neck bracket suspension while retaining the "base-up" position of the lamp. An anti-glare ring around the lamp is adjustable. I am convinced that discharge lighting is now definitely out of the experimental field, although the colour difficulty has certainly not yet been completely overcome. The British Thomson-Houston Co., Ltd., told me of between forty and fifty commercial installations, mostly for main road lighting and using 400-W lamps. The General Electric Co., Ltd., pointed to a new lantern with a one-piece bowl refractor to accommodate the 150-W "Osira" lamp. They, too, have their eye on the lighting of minor roads, using this fitting.

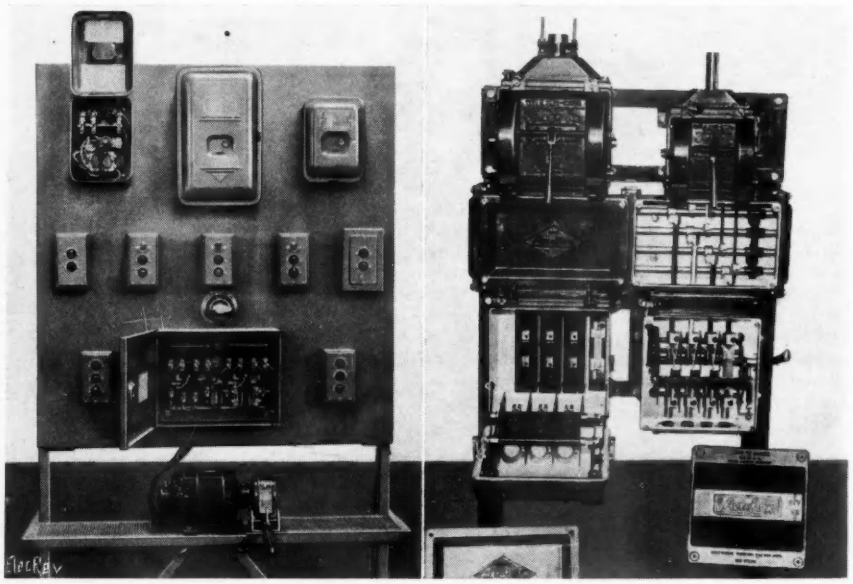
In introducing a fitting suitable for both gas-filled and discharge lamps I think the Revo Electric Co. is doing something to avoid business hold-ups where there is uncertainty on the part of customers as to the adoption of discharge lighting. The fitting has a spun copper top with an internal c.p. reflector and two metal reflectors at the sides glazed with lenticular (ribbed) glass.

I think one outcome of last year's Jubilee flood-lighting activities is the introduction of equipment suitable for both local and flood-lighting, particularly for garden work. Such a fitting, designed for installation in public gardens at Rhyl, I saw displayed by Holophane, Ltd. It is cylindrical in shape, has a conical reflector at the back and diffusing panels at the side. It takes a 200-W lamp.

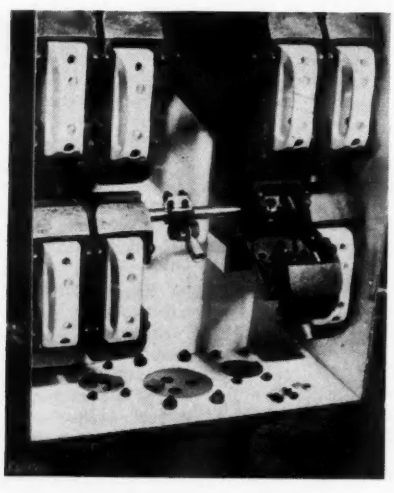
It was pleasing to hear that the B.T.H. have a range of flood-lighting fittings, for a number of lighting concerns have told me that they were too late in the field for last year's Jubilee work. The importance of the "Glassteel" industrial fitting, introduced by Benjamin Electric, is the association it provides between discharge lighting and diffusion.

Because of the dislike I have so often expressed of all forms of "psychological effect" in connection with space-heating equipment, believing that all such moves will tend to hinder progress when the possibilities of decorative lighting in the home are realised, I was more than pleased to hear Mr. Goody (B.T.H.) say that his company is going to make a stand for decorative lighting by means of its architectural lamps.

In view of the load-building change of outlook that is taking place I would not risk voicing an opinion as to the trend of meter developments for the fairly near future. Venners say that the trend is definitely towards the two-part tariff prepayment meter. Their latest model is a dual-coin one with a variable fixed charge unit (3d. to 8s. per week), which is adjustable without unsealing the meter. The latest three-coin meter produced by Sangamo represents an attempt to overcome the bent coin difficulty. The coin chute opens out during the operation, and if the coin will go through the outer slot then it will pass through the mechanism.

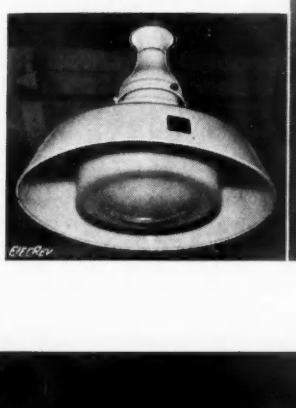


Arrow push-button and magnetic contactor equipment and (right) a distribution board with "Aeroflex" cartridge-fuse switch-fuses



Swivelling bus-bar fuse and adjustable cable lug (English Electric Co.)

"Glassteel" industrial fitting (Benjamin) and, right, a street-lighting equipment for either gasfilled or discharge lamps (Revo)



An Electrical Treatment for Railway Lines

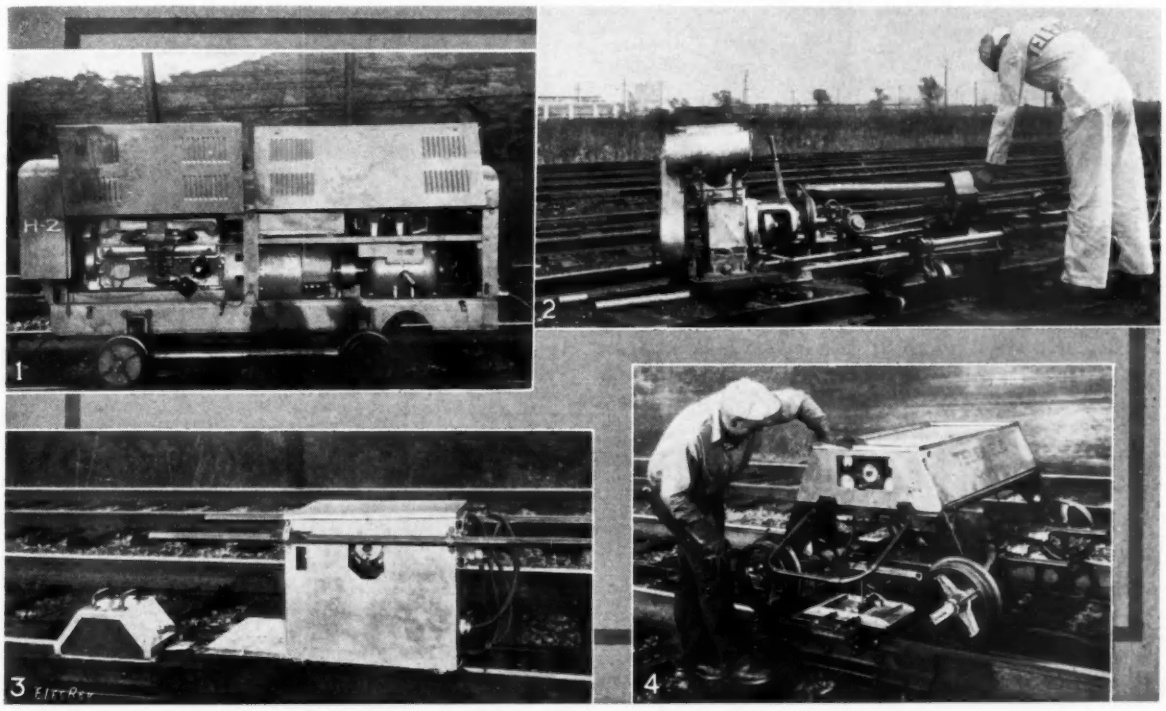
IN America the destructive battering of rail-ends is minimised by a heat treatment process utilising specially designed automatic equipment which results in the heat being accurately and scientifically controlled and uniformly distributed through the ball of the rail.

The heating operation is carried out electrically, and the several appliances employed are motor driven, the necessary power being obtained from a transportable engine-driven generating set. All the appliances used are mounted on trucks having flanged wheels, so that they can be moved along the railway track at the site of operations from one rail-joint to the next.

Before heating operations are started the rail-ends are ground down by means of a surface grinding machine so as to correct any inequalities. Next, by means of a preheating machine, a predetermined temperature level is obtained, which results in accurate tempering after the quenching process. In preheating, an induction device is used which places the head of the rail in the magnetic field of a transformer that is energised with high-frequency a.c. The eddy currents generate uniformly distributed heat all through the ball of the rail.

The treatment of the rail-ends is carried out by means of apparatus which, using a train of gears and a cam system driven by a motor, causes an arc to move rapidly over the rail. This arc stream is spread into the form of a wide brush which produces a relatively "soft" flame. By this method the temperature of the rail is raised to the proper degree for tempering.

An oil quenching device applies circulated oil to the head of the rail at a fixed temperature for an exact and controlled period of time. Further, the preheating and the cooling operations are so arranged that the rail gradually decreases in hardness and blends properly into the untreated metal. The tempering comes from the interior of the metal and not from the rail surface. By means of the treatment the hardness is raised from 260 to 400-450 Brinell. After the heating operations are concluded a cross-cut grinder squares the rail-ends so that expansion and contraction will not cause chipping.



Apparatus for the treatment of rail-ends to minimise battering

1. The power plant which furnishes the electricity for the heat-treatment process. 2. The rail surface is first ground to correct inequalities. 3. Preheating in progress. 4. The electric arcing device which heats the rail for tempering

Further Notes on the I.M.E.A. Exhibition (*Continued from preceding page*)

Metropolitan-Vickers told me that although the load rate meter has made great headway in some areas (North Eastern Supply Co., for instance), a good many supply engineers felt that there was a risk of not securing their fixed charge equivalent. I should think there is little risk on this score though, for the meter should encourage the use of domestic appliances as it gives the smaller type of consumer advantages enjoyed by the one who can pay his bill quarterly.

One of the most interesting things I heard about motors is that the "Texstyle" motor produced by Bruce Peebles specially for the textile industry has found a useful field in farm work for such drives as threshing machines, where dust abounds. My comments on the heavy cable box of a Buxton flameproof motor were answered by Mr. Bailey, who said: "We must not think of current carrying capacity in connection with such severely used equipment." I saw a Brook capacity type motor (incorporated condenser in the starting windings) with the slip-ring and centrifugal switch located outside the frame. The idea is to provide greater accessibility and cleanliness.

More attention could profitably be given to the electrical vehicle development, for properly handled there is much business awaiting within the present design limits. For those who want it there is ample evidence available as to how greatly the absence of noise and fumes is appreciated by customers of the distribution trades (milk, bread, and so on). The latest commercial development, of course, is the serious entry into the field by Metropolitan-Vickers, and during an inspection of a streamlined van intended for propaganda work and a chassis I was impressed mainly by the ten-speed control. There are five control speeds on the motor for each of two battery controls. The latter are afforded by series and parallel arrangements of the battery. The lower speeds are on the parallel arrangement, of course, and it was stressed that the result of this is a higher effective capacity because of the lower rate of discharge. An illustration appears on page 904.

Women's Engineering Society's Conference

The fourteenth annual conference of the Women's Engineering Society is to be held at University Hall, Sheffield, from July 17th to 20th. On the first day, Friday, there will be a civic reception at University Hall by the Lord Mayor of Sheffield, Alderman F. Thraves, followed by the annual dinner, at which Mrs. J. A. Mollison will give her presidential address. Visits to various works will occupy Saturday morning, and the annual general meeting will be held in the late afternoon. A trip to a theatre is planned for the evening. Most of Sunday will be left free, but after lunch a visit has been arranged to the Sheffield Aero Club. The final day delegates will have an opportunity of inspecting the steel works of Messrs. Hadfields, Ltd. Further particulars may be obtained from Miss Caroline Haslett, 20, Regent Street, London, S.W.1.

The Reyrolle Jubilee

FIFTY years ago last Sunday, on June 14th, 1886, the late Mr. A. C. Reyrolle established a small switchgear workshop in London. From that beginning the present works of Messrs. A. Reyrolle & Co., Ltd., have developed. In 1901, when the business was incorporated as a limited company, Mr. Reyrolle removed it to two or three single storey buildings in Hebburn-on-Tyne. The area of the original site, on a small part of which these stood, was 5½ acres. Extensions from time to time have brought the present total to 57 acres, of which 36 are available for still further development. At the start fewer than ten employés were required, and in 1901 there were only fifty-eight. To-day they number about four thousand.

The late Mr. A. C. Reyrolle, founder of Messrs. A. Reyrolle & Co., Ltd.

Although general manufacturing electrical engineers, Messrs. A. Reyrolle & Co., Ltd., specialise in switchgear of all kinds. They developed metal-clad draw-out switchgear and first put it into commission in 1906. In addition to switchgear and ancillary apparatus the company manufactures protective systems, cable sealing-chambers and dividing boxes, electrical accessories, water heating apparatus, industrial electric heating equipment and vacuum cleaners.

Messrs. J. H. Holmes & Co., Ltd., who are now incorporated with Messrs. Reyrolle, have their works adjoining the Reyrolle Hebburn New Town Works, and specialise in the building of electric motors and dynamos.

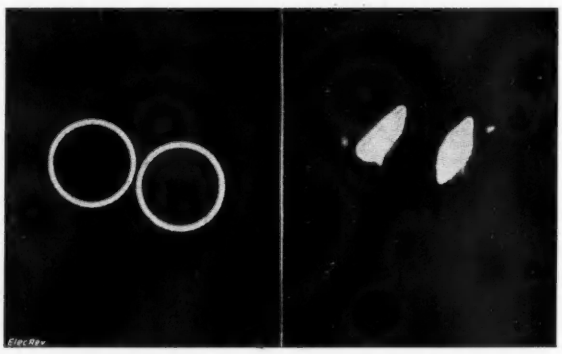
The late Mr. J. H. Holmes, who was responsible for the founding of the company in 1883, was the inventor of the quick-break switch. The first dynamo was made in 1885. Much of the company's work has been the construction of electro-plating dynamos, electric welding sets and other such special machinery. The firm was reorganised in its present form in 1928, and in 1930 the works were transferred to their present site.

At the beginning of 1934 the Parolle Electrical Plant Co., Ltd., was formed, associating the Reyrolle organisation with Messrs. C. A. Parsons & Co., Ltd., the well known makers of turbines and turbo-alternators, &c. A new industry was instituted on Tyneside by Messrs. Reyrolle in the manufacture of insulating materials, and their interest in it was merged in the Bushing Co., Ltd.

Elaborate research facilities include a special short-circuit testing station, the first of its kind in Great Britain, which is said to have the largest output in the world for carrying out performance tests of circuit-breakers and other electrical apparatus. It has an instantaneous short-circuit output of 2,000,000 kVA, and is used to test circuit-breakers rated up to 132,000 V.

Slow-break A.C. Switches

A DISPLAY of the more important recent products of Messrs. J. H. Tucker & Co., Ltd., is being given this week at the London showrooms of the company, 22 and 23, D'Arblay Street, W.1. These include the "Titan" range of switches, switch-fuses, switch-splitters, and lamp-holders, "Stanlok" interlocking switch plugs, "Ultraneat" cooker control units, and protected industrial units. There is also a comprehensive range on show of coloured moulded "Telacite" and other shock-proof fittings. The most striking feature of this miniature exhibition of accessories is, however, the demonstration of the short slow-break switch for a.c. circuits. Time was when the attribution of "quick-break" properties to a tumbler switch was regarded as a merit. This is still the case on d.c. systems, but as these now serve less than an eighth of the total number of consumers connected in Great Britain, attention has been paid to the best means of securing the advantage of breaking at zero current on a.c. circuits.



A.c. flashes when breaking a kettle circuit with slow-break (left) and quick-break s.p. switches

Comparison of the performance of quick-break switches with the recently developed quick-make, slow-break "Link-Boy" switches appears to bear out in practice the results of the tests carried out at the Electrical Engineering Department of Birmingham University, which reports that for any given length of break (on a.c.) a quick-break switch will not open a circuit more quickly than one of the slow-break pattern, but will cause more arcing. The Birmingham University reports also show that the temperature rise of a quick-break contact during opening is more than double that of the slow-break type. Where switches are habitually broken near their rated capacity a slow break should materially lengthen their life.

In addition to the various types available for lighting circuits, slow-break switches are fitted by Messrs. Tucker to their standard cooker control unit for the 1,000-W, 230-V kettle sub-circuit. Tests have shown the flash at contacts with this loading to be hardly perceptible at each operation as against a pronounced arc at an average of about one in three operations when a similar quick-break is employed.

Correspondence

Anonymous Advertisers

Sir,—I have noticed in your last two issues letters from disappointed seekers after situations. No doubt there are many points in favour of the arguments which they adduce from their own point of view, but surely they must understand that the employer has several much stronger arguments upholding the practice of which they complain.

I quite agree that it is very inconsiderate of any employer who has advertised under a box number to omit to insert a note that the situation has been filled. I myself always make a point of sending an immediate answer to unsuitable applicants who enclose a stamped and directed envelope, and even to those who have evidently gone to a considerable amount of trouble in giving details of their qualifications. I also return to these any copies of testimonials, etc., which may be of use to them for future applications.

Your correspondents will no doubt be surprised to learn that probably at least 50 per cent. of those applying give either no details or such particulars as are quite useless for the purpose intended. Quite a proportion also apply well knowing, or they should well know, that their application for the particular appointment will be quite useless. What about those applicants for whom appointments for an interview are made and who never turn up or even send a note of explanation or apology, and for whom the employer has set aside time for the interview?

"Seeker" can rest assured that when an employer advertises a situation vacant without mentioning his name and address he does it with a very good object, the reasons for which will be apparent to most persons. "Seeker" gives one of the reasons, although he may not think that he has hit on such a reason so readily.

FINDER.

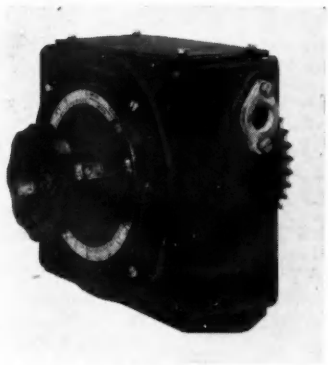
June 12th.

New Apparatus and Devices

for Domestic, Cooking and Heating, Lighting, Power and Scientific Purposes

A Pre-set Speed Controller

There are many applications of variable-speed motors where it is desirable to be able to run the machines up automatically to a predetermined speed, particularly in the case of those machines which have an intermittent duty. In printing, especially with colour work, the quality as well as the output is directly affected by the speed, and it is therefore particularly important to return to the best operating speed as soon as possible after every shut down.



The new B.T.H. speed controller

The type "675/A" pre-set speed controller put forward by the BRITISH THOMSON-HOUSTON CO., LTD., Rugby, is designed for use with three-phase commutator motors to enable the running speed to be reached automatically. On the smallest a.c. commutator motors, and when the speed range is narrow, satisfactory pre-set speed can sometimes be obtained by providing a secondary resistance with a short-circuiting contactor and throwing the motor on the line with the brushes left in the pre-set position; but the number of cases where this method of control can be applied is limited. Usually it is necessary to fit motor-operated brushgear to the motor and return the brushes automatically to the minimum speed position for starting, and under these conditions the pre-set controller is used.

The essential part of the controller is a contact arm operated by the hand-wheel and working in conjunction with a contact disc driven by the pilot motor which moves the brushgear. The handwheel also carries a pointer to indicate the speed of operation. This speed can be pre-set with the motor at rest or adjusted, while running, to the desired value. Thereafter the handwheel can be left untouched and the attendant need only operate the start and stop push-buttons.

The controller can be mounted on the motor endshield and driven by a short chain drive or fixed to the framework of the driven machine, adjacent to the push-button station, and coupled to a chain sprocket on the brush spindle.

"Cone-ring" Flexible Couplings

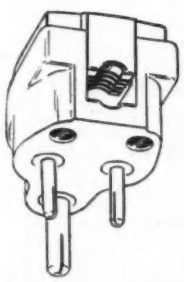


Diagram of the "Temco" plug showing the variable cord-grip

In designing the "Cone-Ring" flexible coupling it was found by MESSRS. DAVID BROWN & SONS (HUDD.), LTD., Huddersfield, that joints and sliding surfaces could be avoided by using a resilient material, which would allow the coupling to fulfil all the necessary functions required of it, relative motion taking place inside the material itself.

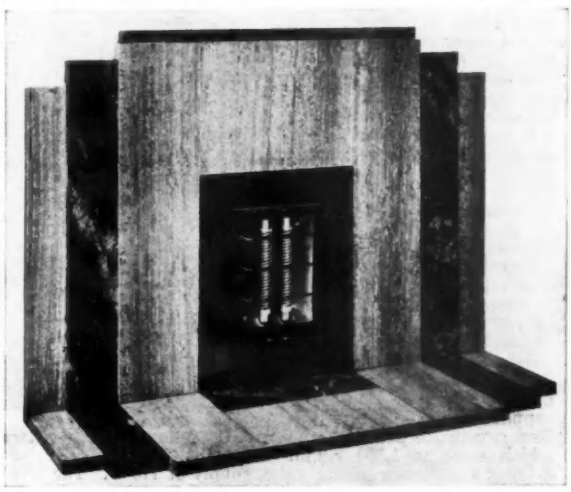
The coupling has been developed from the conventional pin-and-bush type. It permits a degree of alignment error either in eccentricity or angularity that easily covers all errors met with in practice, besides giving freedom of axial movement without surface skidding. The modification introduced is simple, consisting in the substitution for a parallel bush of a series of rubber rings of conical section. With a tangential load the material is free to deform in all directions, and this, for a given pin pressure, allows over four times the torsional flexibility obtainable with sleeve-type bushes in a coupling of given leading dimensions. Further features are that the torsional flexibility is greatest at light loads and diminishes as the load increases, while there is no hysteresis loss (available for damping) so long as the load is constant; the actual loss from zero to maximum load and back is in itself small but sufficient to restrain the building up of vibration.

Multi-colour Rings for Lamps

An attachment which enables a variety of coloured beams to be obtained from an ordinary clear lamp is made by the C. & D. COMPANY, 3A, Grosvenor Road, Chiswick, London, W.4. It consists of a series of coloured bull's-eye lenses attached to two springs which register themselves around the maximum circumference of the lamp and so maintain the lenses in line with the lamp filament. Such a device is applicable for shop-window display lighting, outside decorations, seaside displays, &c. When used with a projector lamp on a revolving table it is possible to obtain a very attractive effect.

A Coal-electric Fireplace

A recently introduced fireplace of MESSRS. BRATT COLBRAN, LTD., 10, Mortimer Street, London, W.1, has been so designed



The "Bratt Colbran" coal-electric fireplace fitted with a 3-kW electric fire

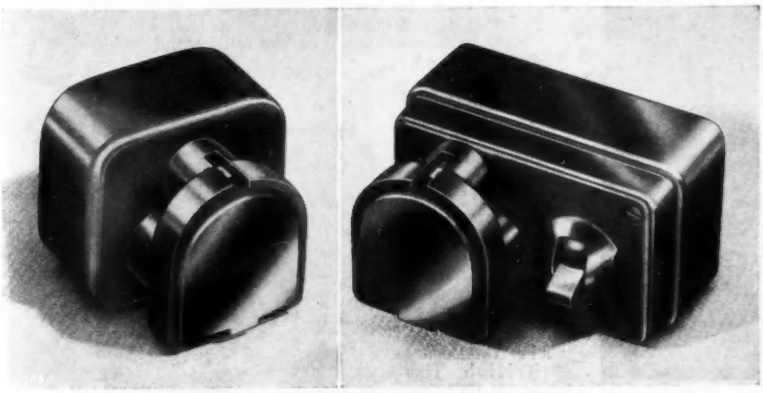
that it is rapidly interchangeable with a coal grate. No fitting is necessary, and a complete unit is formed, whether the coal or the electric fire is in position. The electric fire, which is fitted with a ventilation aperture at the base, is portable and can be obtained with two 1-kW, close-wound elements or two 1½-kW ones of the dual spaced, spiral wound type (as illustrated). Several finishes are available.

"Temco" Switch Sockets and Plugs

In addition to the range of "Temco" switches which has already been referred to in the ELECTRICAL REVIEW, T.M.C.-HARWELL (SALES), LTD., 233, Shaftesbury Avenue, London, W.C.2, has recently introduced a similar series of sockets and switch sockets. Both surface and flush types are available and the cases are made of bakelite, obtainable in either brown or white. The switches are q.m. and b. with square-section bakelite dollies, and are not interlocked with the sockets. Two- and five-ampère sizes are available, and the base in which the switch and socket are mounted is of porcelain. In the case of the flush type there is a generous overlap of the plate to conceal the rough edge of the recess in the wall.

Similarly rated plugs and sockets are also available. The plug itself is of special design, the cord grip (shown in the accompanying sketch) being designed to take almost any size of flexible in common use.

The dimensions of the flush-type switchplug are 3¼ in. long by 2¼ in. wide by 1¼ in. deep, including dolly. The cover of the plug, which is fixed by two captive screws, grips the cord, and a serrated edge prevents the flexible pulling out.

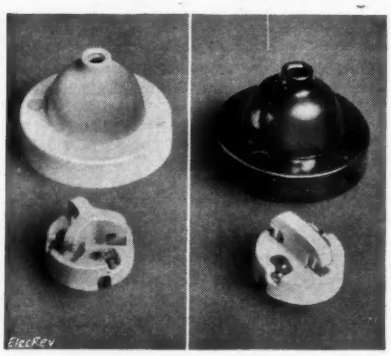


A "Temco" socket and switch-socket with plugs

D

Ceiling Roses

New bakelite ceiling roses with porcelain interiors have just been introduced by ASHLEY ACCESSORIES, LTD., Finch Place, Falkland Street, London Road, Liverpool, 3.

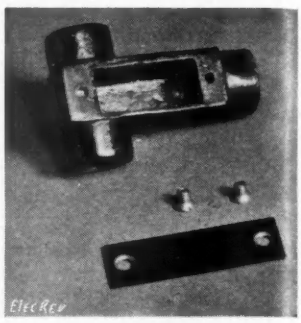


The new "Ashley" ceiling roses with dual purpose terminals

The interiors are made for two- and three-wire circuits with specially shaped bridges, while a new type of terminal is employed, sunk into the porcelain base with the fixing screw in the horizontal plane. Each brass terminal serves a dual purpose, being drilled with both large and small holes to take the incoming house wiring and the outgoing flexible lead. Both brown and white bakelite caps are made.

A Bracket Box

For any position where a narrow opening is required to be left in a wall or partition a bracket box has been designed by SEAL ELECTRIC, LTD., 7, Edward Street, Westminster, London, S.W.1. It is particularly suitable for use with modern tubular striplite fittings or narrow backplate brackets, or behind electric clocks and similar apparatus.



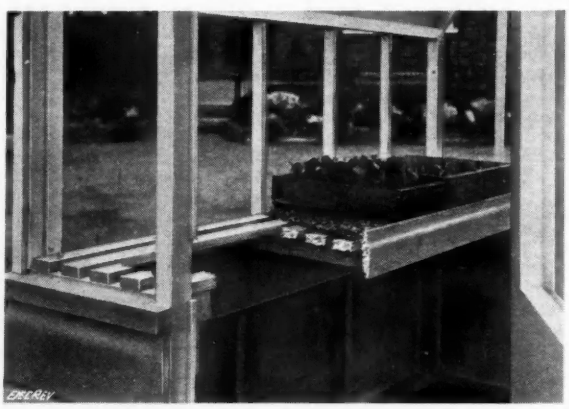
The "Seal" bracket box

It can also be used as a neat draw-in box, and is provided with a screwed lid. The fixing centres are 2 in. apart, which allows any standard fitting to be fixed directly to the box with metal screws, thus earthing the fitting. Vertical or horizontal positions can be employed, and any ways not required can be stopped with the usual brass plug. A two-pin, 2-A socket and plug can be supplied for use with the bracket box, which is the latest addition to a wide range of conduits and conduit fittings manufactured by the company.

Electricity in the Garden

"ELECTRICITY for the Gardener" is the title of a well-arranged and illustrated booklet which has been issued by the Electrical Development Association. It deals with almost every possible application of electricity in this direction, including soil heating and sterilising, floodlighting, plant irradiation, etc., and has arrived at a time when gardening enthusiasm is at its height.

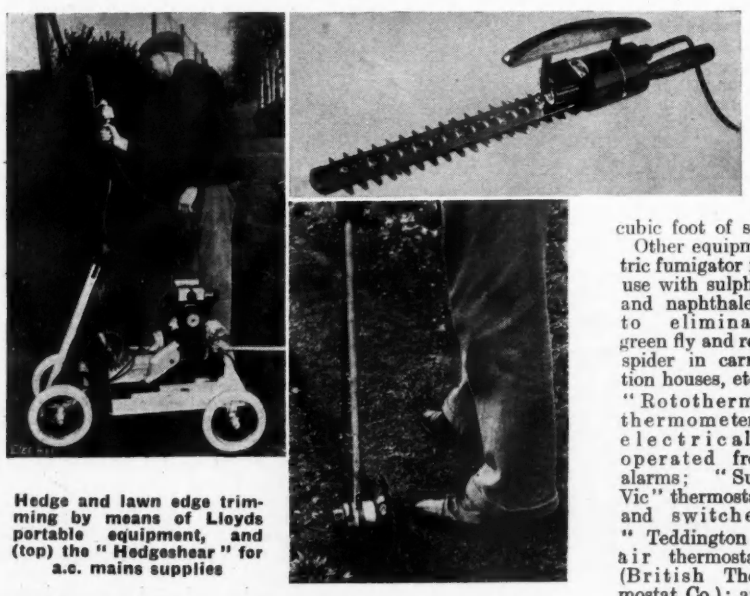
The recent show of the Horticultural Society was not of great electrical interest—it was, in fact, most disappointing in this respect. One interesting exhibit was, however, that of Messrs. Lloyds & Co. (Letchworth), Ltd., Pennsylvania Works, Letchworth, who were showing the "Dextor" electrical hedge trimmer. Energy is supplied by a 0.6-b.h.p. Villiers two-stroke petrol engine which runs at 1,750 r.p.m. driving a generator giving a d.c. supply at 115 V. The whole equipment is mounted on a rubber-tyred trolley provided with a handle, and includes two types of hedge trimmers. One is an oscillating sickle-edged knife for hedge and bush trimming and the other has a rotary knife edge which can also be used for cutting grass edges. The rotary type is also available with a revolving saw edge which can be used for cutting through thick branches. When these are used on a 200/250 V house supply a transformer is necessary, although a special model of the oscillating type, known as the "Hedgeshear," is made with a motor wound for 200/250 V a.c. supplies.



Greenhouse panel heaters made by H. G. Fleet & Co., Ltd.

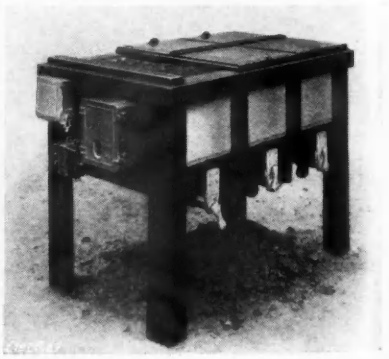
Some interesting electric panel heaters were shown by Messrs. H. G. Fleet & Co., Ltd., Thomson's Close, Harpenden. These heaters are made flat in the form of shelves, and consist of elements embedded in synthetic resin bonded board; they can, however, be mounted vertically. The standard size is 14 in. by 66 in., and spring contact clips are provided to avoid the use of screwed contacts under conditions where they are likely to corrode. Insulated guards are incorporated.

The same company also had on view a range of soil sterilisers. These are built of seasoned timber, but the soil does not come into contact with the woodwork as the anti-corrosive metal electrodes form the sides of the inner soil-containing chamber. The end walls and lids are lined with sheet "Paxbestos." In the 1-cwt. size the container is made without a bottom and rests on a gardener's shovelling board so that when sterilisation is complete the container can be lifted and the earth remains on the board. In the standard half-ton size the earth is discharged from the boxes through bottom opening doors. In the small steriliser the contacts are on the removable lid, ensuring that the plates themselves cannot be touched whilst "alive." In the larger steriliser the same result is achieved by arranging that the main sterilising current can only be switched on by an electrically operated contactor switch. The switch is operated from a low-voltage transformer and is interlocked with the steriliser lids. The smaller types are designed for single-phase work, but the half-ton and one-ton sizes are made so that one-third of the charge can be accommodated in each of three boxes, which are connected through suitably interlocked switches to the three phases of the supply system. The consumption of this appliance is about 1 kWh of electricity for each cubic foot of soil sterilised.



Hedge and lawn edge trimming by means of Lloyds portable equipment, and (top) the "Hedgeshear" for a.c. mains supplies

Other equipment shown on the same stand included an electric fumigator for use with sulphur and naphthalene to eliminate green fly and red-spider in carnation houses, etc.; "Rototherm" thermometers; electrically operated frost alarms; "Sun-Vic" thermostats and switches; "Teddington" air thermostats (British Thermostat Co.); and the General Electric Co.'s soil-heating cable.



A "Fleet" ½-ton electric soil steriliser

British Overseas Electrical Trade

Analysis of imports and exports during May

THERE was a rather smaller expansion than usual (five per cent.) in our electrical exports during May, which is, perhaps, partly accounted for by the fact that with Whit Monday falling on June 1st this year (June 10th in 1935) a certain amount of business was held up at the week-end. It will be seen from the accompanying smaller table, compiled from information abstracted from the Board of Trade returns for the month, that the value of exports was £1,125,846, which was £56,825 more than in May, 1935. Compared with April of this year, which contained two fewer working days, a decrease of £65,997 is recorded.

Among the brighter aspects of the month's trade is a further improvement in cable exports amounting to £60,997, and bringing the total value of such shipments in the month to nearly a quarter of a million pounds. Exports of wires and cable with insulation other than rubber were particularly good. The chief destinations in the case of wires and cables other than the telegraph and telephone type, with comparative figures for May, 1935, in parentheses, were as follows :—

Rubber insulated wires and cables.—South Africa, £32,087 (£21,912); Australia, £28,925 (£20,635); British India, £10,827 (£14,520); New Zealand, £4,633 (£5,794); other British countries, £13,173 (£15,346); foreign countries, £9,687 (£8,647).

Electric wires and cables (insulation other than rubber).—South Africa, £31,195 (£20,312); Australia, £25,817 (£9,019); British India, £11,160 (£9,169); other British countries, £11,283 (£12,171); foreign countries, £12,454 (£14,219).

A happy sign is the appreciable rise (£24,431) in the value of unenumerated goods shipped overseas, the total amount being the highest so far this year. That the upward tendency in this section has been fairly steady lately is shown by the following figures :—January, £128,143; February, £111,823; March, £141,555; April, £142,767; May, £152,151. Whereas special shipments of large plant cause considerable fluctuations in the monthly returns, so that it is difficult to judge whether there is an improvement in trade, the amount of smaller exports is a fairly reliable indication of the position, although price levels have also to be considered.

After the heavy shipments of telegraph and telephone apparatus in recent months, a falling-off is not altogether unexpected. It seems that no particular country was responsible for the rather large reduction last month, the chief destinations, with comparative figures, being as follows :—South Africa, £28,969 (£34,151); Australia, £19,951 (£20,858); Argentina, £19,190 (£36,512); Canada, £1,795 (£1,176); other British countries, £25,357 (£15,433); other foreign countries, £38,264 (£57,284).

Both motor and generator exports were less favourable, but on the whole consignments of machinery were of a greater value than in the corresponding month of last year. As has been the case for two or three months, exports of convertors, transformers and starting and controlling gear for motors were well up (£30,735), while switchgear shipments were substantial at £92,719.

Proportionally, imports have expanded to a much greater extent than exports, namely, 17 per cent. Apart from radio parts and accessories there were no noteworthy declines, while cables and lighting apparatus were outstanding among those items showing an increase. Germany was the principal source from which equipment was obtained, the position having previously been held by the United States. The following is an analysis of imports, with comparative figures for May, 1935, in parentheses :—

Electrical goods and apparatus.—Germany, £70,349 (£58,355); United States, £68,493 (£63,194); Netherlands, £45,165 (£52,380); Belgium, £23,013 (£7,194); Switzerland, £17,731 (£14,512); France, £7,109 (£9,645); Austria, £4,089 (£4,854); other foreign countries, £29,033 (£13,555); British countries, £14,054 (£9,013).

Electric vacuum cleaners.—United States, £8,203 (£4,108); Canada, £2,608 (£8,043); Sweden, £2,288 (£2,340); Germany, £2,079 (£1,440); other foreign countries, £3,486 (£2,353).

The greater extent to which equipment such as switchgear, motor starters and transformers has been sent overseas is shown by the total to date this year (£1,227,680), as compared with that for the corresponding five months of last year (£916,620). Altogether, exports up to the end of May amounted to £5,923,361, an increase of £584,146, or 11 per cent. Imports at £1,629,020 were up £282,019 (21 per cent.) as compared with the first five months of last year.

EXPORTS AND IMPORTS DURING MAY

	Exports.		Imports.	
	May, 1936.	Inc. or dec. compared with May, 1935.	May, 1936.	Inc. or dec. compared with May, 1935.
Submarine telegraph and telephone cables	£3,525	+ £3,341	*	—
Telegraph and telephone wires and cables (not submarine)	47,778	+ 18,159	*	—
Other insulated wires and cables	191,241	+ 39,497	£41,761	+ £25,164
Radio receivers (not radiograms), excluding valves	14,805	+ 4,636	20,130	— 3,665
Radio transmitters (excluding valves)	18,175	— 10,953	*	—
Radio valves	31,076	— 11,989	12,259	— 937
Other radio parts and accessories	31,459	— 8,205	48,263	— 11,392
Telegraph and telephone apparatus (other than radio)	133,526	— 31,888	*	—
Electric carbons	*	—	10,882	+ 2,136
Incandescent lamps	47,160	— 257	12,577	+ 3,355
Other lighting apparatus	38,303	— 1,301	39,390	+ 17,878
Primary batteries	13,989	+ 3,620	13	— 508
Accumulators	39,172	— 1,411	*	—
House service meters	15,305	+ 2,315	*	—
Other electrical instruments	14,748	— 2,490	23,981	+ 5,013
Unenumerated electrical goods and apparatus	152,151	+ 24,431	69,780	+ 9,290
Electric generators up to 200 kW	25,913	+ 262	*	—
Electric generators over 200 kW	33,898	— 5,487	*	—
Electric motors	72,026	— 1,389	33,359†	+ 3,309
Convertors and transformers	55,248	+ 11,909	*	—
Starting and controlling gear for motors	42,126	+ 18,826	*	—
Switchgear	92,719	+ 6,959	*	—
Other electrical machinery	11,503	— 1,760	12,063	+ 451
Electric vacuum cleaners	*	—	18,664	+ 380
Total	£1,125,846	+ £56,825	£343,122	+ £50,474

* Not classified separately. † Not railway and tramway motors.

BRITISH ELECTRICAL EXPORTS DURING MAY

Destination.	Goods and apparatus, May, 1936.	Inc. or dec. compared with May, 1935.	Electric generators, May, 1936.	Inc. or dec. compared with May, 1935.	Motors, May, 1936.	Inc. or dec. compared with May, 1935.	Other electrical machinery, May, 1936.	Inc. or dec. compared with May, 1935.
Irish Free State	£24,736	— £1,164	*	—	*	—	*	—
Channel Islands	9,958	— 2,851	*	—	*	—	*	—
Union of South Africa	175,423	+ 36,385	£13,662	+ £11,207	£13,081	— £7,114	£61,798	+ £20,696
British India	93,623	+ 17,437	6,477	— 9,233	16,224	+ 8,242	47,993	+ 16,027
British Malaya	20,940	+ 6,724	*	—	*	—	10,926	+ 1,719
Ceylon	5,839	— 428	*	—	*	—	*	—
Hong Kong	4,664	— 3,266	*	—	*	—	*	—
Australia	116,124	+ 22,427	18,823	+ 15,708	8,802	— 1,949	23,638	+ 14,754
New Zealand	42,171	+ 2,661	*	—	1,704	— 1,090	4,370	— 2,052
Canada	9,568	+ 1,786	1,154	+ 652	2,983	+ 434	1,668	+ 57
Other British Countries	44,616	+ 6,648	11,302	— 1,268	12,895	+ 2,961	15,029	— 12,318
Sweden	9,681	— 2,712	*	—	*	—	*	—
Denmark	23,884	+ 4,785	*	—	*	—	*	—
Netherlands	14,152	— 5,728	382	+ 368	*	—	1,192	— 94
Belgium	7,312	— 4,148	*	—	*	—	*	—
France	13,664	+ 1,004	*	—	*	—	2,773	— 816
Portugal	3,383	— 3,646	*	—	*	—	*	—
Spain	5,708	— 7,794	*	—	*	—	*	—
Italy	197	— 20,381	*	—	*	—	*	—
Greece	3,807	— 2,786	*	—	*	—	*	—
Rumania	10,093	+ 7,057	*	—	*	—	*	—
Egypt	5,087	— 8,169	*	—	*	—	3,609	+ 3,072
China	7,355	— 96	*	—	*	—	2,943	— 6,388
Brazil	21,531	— 7,148	*	—	*	—	*	—
Argentina	38,735	— 14,296	*	—	1,809	— 653	1,413	— 501
Soviet Union	*	—	*	—	598	+ 567	*	—
Other Foreign Countries	80,162	+ 5,204	8,011	— 22,659	13,930	— 2,787	24,244	+ 1,778
Total	£792,413	+ £27,505	£59,811	— £5,225	£72,026	— £1,389	£201,596	+ £35,934

* Not classified separately.

World Electricity Supply

General advance in 1935

THE annual returns collected by *Elektrizitätswirtschaft** show continued satisfactory development of electricity generation in most of the principal countries of the world. Complete statistics are not available for all countries, but from data relating to ten of the largest producers, with an output of 217,000 million kWh in 1935 compared with 195,000 million kWh in 1934 (an increase of 11 per cent.), and guided by the final statistics for earlier years, it is deduced that the world total for 1935 was about 375,000 million kWh, compared with 345,000 million kWh in 1934, an increase of nearly 8¾ per cent.

Table I shows that the retrogression of some countries during the period 1929-32 has now been replaced by a general increase, but to a considerably varying extent in different countries, the increase in 1935 being above the world average in Germany, Great Britain, Belgium, Poland and Russia; between 5 and 10 per cent. in Switzerland, Italy and the United States; and only 2 to 3 per cent. in France and Czechoslovakia. To some extent these differences reflect the economic development of the countries concerned, but it is pointed out that the quantity of electricity generated does not constitute a complete "barometer of trade"; for example, electrical expansion continued almost uninterruptedly in Great Britain and Italy during the years of trade depression.

TABLE 1.—GROWTH OF ELECTRICITY GENERATION 1929-1935.

	Basis P = public supply stations. A = total, including private generation.	1929.	1932.	1933.	1934.	1935.
Germany*... ...	P	16.61	13.41	14.34	16.54	19.10†
"	A	31.55	24.27	26.47	31.00†	35.00†
Belgium	A	4.02	3.93	3.90	4.02	4.46
France	A	14.35	13.59	14.91	15.40†	15.90†
Switzerland‡ ...	A	5.30	4.79	4.94	5.36	5.71
Austria	A	—	2.12	2.27	2.34	—
Czechoslovakia ...	A	3.38	2.65	2.66	2.90	2.97
Poland	A	3.02	2.24	2.39	2.42	2.81
Great Britain ...	P	10.30	12.22	13.56	15.46	17.57
" " ...	A	17.56	18.71	20.30	22.80	—
Italy	P	9.93	10.01	11.06	11.88	12.95†
Russia	A	6.22	13.39	16.37	20.50	26.00†
U.S.A.	P	91.42	77.87	79.98	85.97	93.58†
Canada	P	17.96	16.05	17.34	21.17	23.50†

* Including the Saar. † Estimated. ‡ Years ending September 30th, 1928/29, etc.

Special attention is drawn to the increase in hydro-electric generation. In seventy-two of the larger German stations, the hydro-electric production increased from 15.7 to 17.5 per cent. of the total in 1935; and in the sixty-eight largest French stations the output from water power rose by 9.8 per cent. to 7,190 million kWh, the steam production meanwhile decreasing by about 8 per cent. to 3,871 million kWh, so that the proportion of hydro-electric generation rose from 60 to 65 per cent. In the United States the public supply stations, excluding traction plants, increased their hydro-electric generation to 37,000 million kWh or from about 37 to 40 per cent. of their total output. A further increase in the hydro-electric generation of France and the United States is expected during this year.

Electrochemical and electrometallurgical applications have gained further in importance in many countries and a substantial increase in industrial electric heating is reported from nearly every highly industrialised country. Increased use of electricity for traction purposes has arisen from main-line electrification schemes and from trolley-bus developments.

The increased use of electric cookers is significant of the possibilities of domestic electric heating. At the end of 1935, there were about 400,000 electric cookers in Germany, more than 420,000 in Great Britain, 1,470,000 in the United States, more than 90,000 in Switzerland, and about 80,000 in France; the world total is believed considerably to exceed 3,000,000. In Germany, the progress made in the installation of electric cookers has been greater in the supply areas of the large "overland" stations than in the cities. Among the cities, Chemnitz heads the list with 42.4 electric cookers per 1,000 consumers, and Berlin has 19 cookers per 1,000 consumers, which is described as a medium figure. The high average of 53 cookers per 1,000 consumers served by six stations in Pomerania (output per station ranging from 2.3 to 5.0 million kWh per annum), is mainly due to the town of Belgard where the closing of the gasworks has resulted in the use of 570 electric cookers per 1,000 consumers.

A specially valuable feature of the reports from the various supply areas in Germany and, on broader lines, from other countries, is the information given concerning tariff and other measures adopted to increase the utilisation of electricity. In general, these have been very successful and indicate the favourable results that may be expected from continued effort in this direction. For example, "specially vigorous publicity" for electric cookers in Silesia resulted in three stations reaching 57-94 cookers per 1,000 consumers and two 114 and 130.

"Experimental Villages"

The Wesertal (Lower Saxony) electricity undertaking has developed the hamlet of Frenke as an "electro-experimental village" with a view to ascertaining the economic possibilities of electric heating in rural communities. The consumers have expressed great satisfaction with electric cookers and refrigerators but some difficulty has been experienced with fodder boilers owing to local peculiarities of pig-feeding. For the last quarter of 1935, the consumption of 15 consumers in this village increased by 327 per cent. compared with the corresponding period in 1934, the average tariff being now one-third the former charge per kWh. Other "experimental villages" give similarly favourable indications of the possibilities of electricity supply developments in rural areas. In some places where there are seasonal variations in the available supply of cheap hydro-electric power, combined electric and coal- or wood-burning cookers have proved attractive to consumers and supply authorities alike.

Side by side with the general increase of activity in electrical construction during 1935, the extension of high-voltage networks and increased activity in electrical manufacturing, there was a corresponding increase in electrical exports, the total value for the 15 principal countries being estimated at £45,000,000 for 1935 (at 20 mk. = £1), an increase of 5 per cent. on the figure for 1934. Owing to the depressed level of prices, this increase in value does not fully represent the increased volume of electrical exports. Thus, the value of German electrical exports increased from about £11,300,000 in 1934 to £11,660,000 in 1935 (at 20 mk. = £1), including the Saar, or by about 3 per cent., whereas the increase allowing for price changes was about 14 per cent.

Table 2 affords interesting data concerning the present level

TABLE II.—ELECTRICAL DEVELOPMENT IN VARIOUS COUNTRIES

Country.	Population. Millions.	Area. 1,000 sq. miles.	Population density. Inhab./sq. mile.	Proportion of population in: Communities with under 10,000 inhabitants. %	Proportion of population in: Cities with over 100,000 inhabitants. %	Proportion engaged in: Industry and mining. %	Proportion engaged in: Agriculture and forestry. %	Total electricity generated 1934. 1,000 million kWh.	kWh. per head of population.
Germany	66.6	182	365	51	30	40	29	31.0	470
Holland	8.3	13.2	630	36	27	39	21	2.3	280
Belgium	8.3	11.8	700	54	12	43	16	4.0	480
France	41.9	214	196	62	16	35	38	15.4	370
Switzerland	4.1	16	256	70	16	45	25	5.4	1,310
Austria	6.8	32.5	210	61	32	37	32	2.3	340
Czechoslovakia	15.0	54.2	276	77	10	37	38	2.9	190
Poland	33.4	151	220	79	11	12	75	2.4	70
Denmark	3.7	16.9	220	61	22	30	35	0.7	190
Sweden	6.3	174	36	73	15	33	40	5.6	890
Norway	2.9	125	20	77	9	27	36	10.0	3,400
Great Britain	46.7	94	497	28	44	50	7	22.8	490
Italy	42.6	120	355	50	17	30	47	11.9	280
South Slavonia	14.2	96	148	87	4	—	—	1.0	70
Finland	3.7	150	25	62	7	22	65	1.5	400
Russia in Europe	128.1	1,840	70	84	7	10	84	20.5	120
" " Asia	37.6	6,390	6	—	—	—	—		
United States of America ...	126.4	3,030	42	53	30	35	22	105.0	830
Canada	10.7	3,700	3	63	22	30	36	21.2	1,990
Argentina	11.8	1,080	11	—	—	—	—	1.8	160
Japan	67.2	148	455	59	18	20	50	18.0	270
China	450.0	2,760	163	—	—	—	—	2.5	6
Australia	6.7	2,990	2	—	46	36	22	2.8	420

* Vol. 35, No. 6. The special issue containing these returns is procurable from Franckh'sche Verlagshandlung W. Keller & Co., Berlin, W.62, Lützowplatz 1.

of electrical development in different countries in relation to the density of population, general distribution of population in small and large communities, and relative importance of industry and agriculture. Countries with an abundance of water power and a lack of coal, *e.g.*, Switzerland, Norway, Finland and (partially) Sweden and Canada, are in a specially favourable position, particularly as regards heavy industrial loads (electrochemical, electrometallurgical and paper making), and in these countries the export of electricity is or may become of special importance.

The present level of electrical generation per head of population is approximately equal in Great Britain, Belgium and Germany (470-490 kWh per head per annum), followed by France, Austria, Italy and Holland (370-280 kWh per head). Even in these countries there is clearly much scope for development, while as regards such countries as China and India the field has hardly been touched. Important developments in electrical legislation were effected during 1935 in Germany, France, the United States, Czechoslovakia and South Slavonia; the bases and aims vary, but these legislative developments in conjunction with earlier measures show that the national importance of electricity supply has carried it beyond the sphere of private enterprise and made essential some form of state control.

Parliamentary News (BY OUR SPECIAL REPORTER)

ON June 10th Mr. Day asked the Minister of Transport whether the electric automatic traffic lights installed in the West End of London were working satisfactorily.

Mr. Hore-Belisha said that he was advised that the light-control signals in the West End of London were working satisfactorily. In Westminster, St. Marylebone and Kensington there were signals in operation at 115 intersections. Grants had been issued for a further twenty-eight installations, and schemes were under discussion with the local authorities with regard to thirty-five other installations.

"Safeguarding" Radio Valves

As we briefly mentioned in our last issue, during the Committee stage of the Finance Bill on June 9th Mr. Benson moved to omit from Clause 5 a paragraph bringing into the Schedule of the Safeguarding of Industries Act parts of wireless valves and similar rectifiers and parts of vacuum tubes, whether such tubes are finished or not. He said that there was to-day no justification for including wireless valves in the Act. There was no competition between the small close ring of valve manufacturers in this country except the competition of advertisement, and although they had reduced prices there was still a large margin by which they could reduce prices. A foreign valve on which duty of 33⅓ per cent. had been paid could be bought for half the price of a British valve. The home manufacturers had a monopoly of the market and were charging monopoly prices.

Mr. Graham White said that if it were true that valves which cost 2s. 6d. to make were sold for 15s. or 17s. 6d. the Government could not tell them that protection was required. One of the difficulties in spreading the use of wireless in the schools and elsewhere was the cost of the sets.

Dr. Burgin, who replied for the Government, said that the wireless valve was essential to the defence of every country. An important factor in defence was communication and communication involved the use of every type of wireless valve. There was a widespread importation of parts in order that those parts might be assembled here. Valve parts should be manufactured in Great Britain, and he wanted by means of this inducement to see that every part of a valve was made in this country, so that we were not caught napping in a time of emergency. The amendment would have the effect of leaving the whole valve liable to the safguarding duty, while leaving the pieces from which the whole valve was made not subject to duty. The duty on valve parts would not increase the price of sets.

Mr. Graham White said that he gathered that practically the only reason for including parts of wireless apparatus under the Key Industries Duties was a military one. That being the case, he asked the Parliamentary Secretary to say that the Committee which was considering the profits on munitions would have regard to the fact that valves were sold for 17s. 6d. which cost 2s. 6d. to manufacture.

Mr. A. V. Alexander said that wireless receiving sets were very largely manufactured by those who were also valve-makers. The co-operative societies had had experience of this matter. They were subjected to a complete boycott by the ring dealing with wireless sets, and were forced, in consequence, and in self-defence, to go in for the production of wireless sets for themselves. They had therefore to collect the various parts for building the sets. It was burking the whole issue to say that the question of price was irrelevant.

Dr. Burgin said he had made no admission whatever that any valve selling at 17s. 6d. cost 2s. 6d. in labour or material. The whole idea was quite fantastic. There was no connection between the list price of a valve and the price at which the valve was sold to the maker of a set. The receiving set was priced by the manufacturer at a figure which included the cost price to the manufacturers of the valve, not the list price. Consequently, nothing that he was proposing in this clause of the Finance Bill affected the price of the set. The valve manufacturers emphatically denied that a valve listed at 17s. 6d. could be produced for 2s. 6d.

The amendment was rejected by 197 votes to 133.

In the Courts

IN the Court of Appeal on June 12th, before Lords Justices Greer, Greene and Scott, the British Crystal Lamp Co. appealed from a judgment of Mr. C. M. Pitman, K.C., the Official Referee, in favour of the Northern Electrical Distributors Co. (Hull) and Mr. J. B. Breed (who carried on and traded under the name of the latter company) on the counterclaims raised by both parties against each other. The proceedings before the Official Referee were reported in the ELECTRICAL REVIEW of December 27th, 1935.

The material facts of the case were that in June, 1933, the British Crystal Lamp Co. entered into an agreement with Mr. Breed under which the Northern Electrical Distributors Co. were appointed sole distributors for the sale of "Fenbo" electric lamps in Hull and district and to sell to Mr. Breed quantities of the lamps for the purpose of resale to Mr. Breed's customers in the district. The agreement was to remain in force for twelve months, but was afterwards continued.

Mr. Breed alleged that in pursuance of the agreement his company had sold large quantities of the lamps during the period of the agreement and had built up a large connection of customers. He stated that it was a term of the contract that the lamps should be reasonably fit for the purpose of resale, but that large quantities of them were defectively constructed in that the caps were not firmly fixed, short-circuiting occurring, and on one occasion an explosion happened in a customer's premises. In these circumstances customers returned the lamps and refused to deal further, and the distributing business failed altogether. In this respect his company claimed £400 damages.

In reply to the counterclaim the British Crystal Lamp Co. denied that it manufactured "Fenbo" lamps, but was merely the agent for their sale in the United Kingdom, and it also denied that Mr. Breed or his company relied on the company's skill and judgment in the manufacture of the lamps, and it further denied that it was liable for any damages at all.

In a second action Mr. Breed claimed £157 under an agreement by which he alleged that the lamp company agreed to supply him during every week covered by the agreement with lamps to the value of £20 and had failed to do so. The lamp company denied that Mr. Breed, within the period, had purchased the proper number of lamps as agreed, and counterclaimed for £298 damages.

Judgment had previously been entered for both parties on their claims in the two actions, viz., for the lamp company to recover £103 as the balance of an account for "Fenbo" electric lamps sold to the Northern Electrical Distributors Co., and for Mr. Breed on his claim in his action against the lamp company. In these circumstances the Official Referee had only to try the two counterclaims. After a long hearing, he held that Mr. Breed was entitled to recover damages on his counterclaim, and which he assessed at £250, for which amount judgment was entered for Mr. Breed, with costs. The Official Referee also entered judgment for Mr. Breed, with costs, on the British Crystal Lamp Co.'s counterclaim, and from both these results the lamp company now appealed.

Mr. Raeburn, in opening for the appellants, said that his clients supplied lamps to Mr. Breed during the life of the contract under its terms, and there was no complaint at first, but in March, 1934, Mr. Breed was supplied with some thousands of lamps, a number of which were found to be faulty, the fault appearing to be in the cement which held the glass to the cap. In all during 1934-35 about 3,040 lamps were sent back, and Mr. Breed did not allege that there had been any difficulty in getting replacements.

Counsel contended that in the circumstances the damages which Mr. Breed had sought to recover were too remote and that the Official Referee was not justified upon the evidence in awarding him £250.

The hearing was adjourned on June 15th until a day to be fixed later.

Electricity Supplied to Neighbours

On June 5th, at the Wallingford Petty Sessions, Charles J. Mallett, Didcot, was summoned for supplying electricity, received from the Wessex Electricity Co., to his next-door neighbour, Sidney Bell, who was also summoned for aiding and abetting Mallett.

It was stated for the prosecution that Bell's supply had been cut off on account of non-payment of accounts; his supply was on the flat rate of 8d. per kWh. Mallett had connected wires between his own installation and Bell's, and thereby provided him with electricity at 1½d. per kWh—Mallett being on a two-part domestic rate.

Mallett said that he had merely made a "friendly gesture" to a neighbour; the electricity supplied had been paid for, and there was no intention to defraud.

Business and Industrial Notes

The Week's News. Showrooms and Exhibitions. New Installations. Overseas Trade. Publicity Material. Trade Announcements. Prices of Materials. Liquidations and Bankruptcies.

New Showrooms at Flint

The official opening of the North Wales Power Company's new showrooms and offices in Chester Road, Flint, was performed recently by the Mayor, Alderman F. B. Edwards. At a luncheon which followed, Mr. G. K. Paton, engineer and manager of the company, stated that the company had spent about £60,000 on electrical development in the Flint and Holywell urban and rural districts, and about £120,000 per annum in rural areas generally.

An Electric Motor Repair Works

Described as "a hospital for electric motors," new premises for the Midland Electrical Installation Co., Ltd., were formally opened at Cyprus Works, Upper Villiers Street, Wolverhampton, on June 11th by Sir Charles Marston. The company was established in one workshop in Old Mill Street, Wolverhampton, in 1919, and its subsequent expansion into adjoining premises has now reached a stage when entirely fresh workshops are necessary. The new premises in Upper Villiers Street are part of the former Sunbeam Motor Car Company's Works. A large number of important contracts already in hand will keep the company busy well into the autumn. Before pressing the electric switch which set all the machinery in the new factory in motion, Sir Charles Marston, who was accompanied by Lady Marston, commended the step which Mr. Henry Joseph, managing director of the company, had taken in opening these new premises. Alderman T. R. Wood, Mayor of Bilston, and Mr. F. H. Farres (managing director of the Villiers Engineering Co., Wolverhampton) both wished the firm success in its new venture. After the machinery had been set in motion the visitors made a tour of inspection of the new works.

Local Exhibitions

In co-operation with Philips Industrial, Manchester Corporation Electricity Department is now holding a demonstration of welding plant and rods, condensers, oxide cathode rectifiers, rectifiers for battery charging and other apparatus in its demonstration workshop in Dickinson Street. Among the items on view are "Philora" sodium and mercury electric-

The new showrooms which the North Wales Power Co. has just opened at Flint

discharge lamps and industrial lighting fittings, colour constancy testing apparatus for paints, lacquers, &c., neon X-ray negatives showing the application of X-rays to a number

The exterior and ground floor of the new electricity showrooms at Plymouth described in our last week's issue (p. 880). Red "Osira" floodlights are used to illuminate the upper part of the façade

In the Courts *(Continued from preceding page)*

The chairman of the magistrates said that, although they regarded the case as a serious one, in view of the low wages received by the defendants the penalty of £5 provided by the relevant Act would be reduced to £1, with £1 costs.

The company's solicitor said the company did not wish to inflict any hardship on the defendants, and he suggested that the fine should be reduced to a shilling each. The Bench agreed to this.

At Wigan last week Ellen Prescott, of Hindley, answered summonses for laying an electric cable connecting the supply of electricity from the service at her former home to an adjacent house of which she was the owner, and also for supplying electricity to her tenant next door, all without the consent of the Hindley District Council, who are the undertakers. After hearing the evidence, the Bench dismissed both summonses on payment of costs amounting to £4.

Action Against the E.T.U.

In the Chancery Division this week Mr. Justice Clauson heard an action brought by Mr. Horace J. Mason against the Electrical Trades Union asking for an injunction restraining the Union from wrongfully excluding him from membership. For the Union it was stated that the plaintiff's subscriptions had fallen into arrears for 26 weeks, and he was expelled.

The plaintiff, in evidence, said that he was a charge engineer with the London Passenger Transport Board. He had been a member of the E.T.U. since 1929. He had been expelled on a previous occasion when an action which he brought against the Union was settled. He disputed the amount said to be owing to the Union. He denied that he was a "truculent, impossible, self-opinionated man."

Mr. H. H. Morton, secretary of the London Station Engineers' No. 1 Branch of the Union, stated that the plaintiff had not asked for a special meeting to be called.

When the case was called on Wednesday Mr. Evershed, K.C., defendant's counsel, said that the parties had arrived at a settlement of the proceedings. The Union agreed that the expulsion of Mr. Mason from the Union was void and on that Mr. Mason agreed to resign from the Union and the Union would pay Mr. Mason's costs of the action.

His Lordship made an order accordingly.

of industrial problems. The exhibition closes next Wednesday, June 24th.

An exhibition of domestic electrical appliances organised by a committee of local electrical traders is being held this week in Park Hall, London Road, Westcliff-on-Sea.

In an endeavour to attract new industries to their county, and to stop the drift to the South, nine Lancashire towns are co-operating in a North-East Lancashire Industries Exhibition which was opened by the Earl of Derby at Blackburn on June 10th. Textile, electrical, iron and steel, brewery and other manufacturing firms of Blackburn, Bury, Burnley, Chorley, Clitheroe, Colne, Darwen, Haslingden and Todmorden are taking part in the exhibition, the first of its kind. There are more than 320 exhibitors. New Zealand, which gives free entry to Lancashire cotton and electrical goods, is also participating as a gesture of goodwill towards Lancashire.

Recent Contracts

Wild-Barfield Electric Furnaces, Ltd., have just installed thirty-three furnaces in one works alone. Most of them are large batch type, the remainder being mechanically operated, and at the present time nine more furnaces are in course of construction and erection for the same company. Many orders are also in hand for a considerable number of continuous furnaces, and forced air circulation furnaces with centrifugal fans for various purposes. Similar activity is being experienced by the company's manufacturing licensees in France and Scandinavia. The introduction of "tubular-hairpin" heating elements has enabled the company to manufacture electric furnaces with nickel-chromium elements for furnace temperatures up to 1,150 deg. C.

The British Central Electrical Co., Ltd., has received a contract from the War Office for the supply of "Gripper" handlamps.

The Northern Cable and Wire Works, Copenhagen, has placed an order with Standard Telephones and Cables, Ltd., for Pupin coils valued at £17,900.

A Low-voltage All-electric Kitchen

Details are given in the *Electrical and Radio Trader of Australia* of a low-voltage (32 V) all-electric kitchen recently opened at the Wynyard Street Station of the New South Wales Government Railways. This follows a similar installation at the Central Railway Station (Sydney), where substantial savings have been effected over fuel and gas cookers and fryers. A good deal of special apparatus has been designed for the new kitchen, in which the electrical load amounts to 760 kW (510 kW for cooking and water heating, 64 kW for lighting and 190 kWh for power, air-conditioning, &c.).

Registered Electrical Contractors

At the last meeting of the Executive Committee of the National Register of Electrical Installation Contractors, the applications from the following for registration were accepted:—D. H. Gittins & Co., Birmingham; T. Stanley, Thornton Heath; and N. Moore, Padiham, nr. Bromley. At the same meeting two applications were withdrawn and two were declined.

Annual Holidays

Messrs. A. Reyrolle & Co., Ltd., inform us that their offices will be closed during Race Week from June 24th to 29th, and the works and stores from mid-day June 20th to June 29th.

Messrs. Waite & Son, Ltd., are closing their factory from June 20th to 29th for their annual holiday.

For Sale

Southgate Borough Council has for sale electric charging plant.

Aylesbury Electricity Department has for sale one 500 kW rotary convertor and transformer, and one 1,000 kVA transformer.

The Bristol and Southampton staffs of the Hotpoint Electric Appliance Co., Ltd., at Cheddar

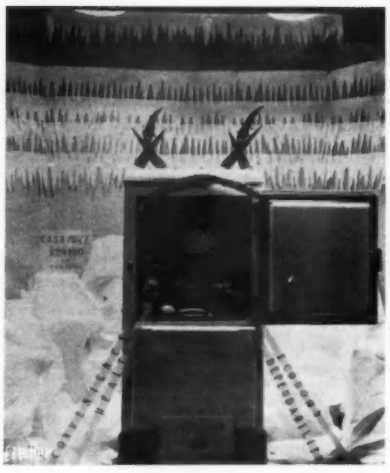
The Boston & District Electric Supply Co., Ltd., invites offers for generating station plant.

Walthamstow Borough Council has d.c. house service meters and time switches for sale.

(See our classified advertisements.)

A Kettering Carnival Award

"I'm Electric," the Kettering Urban District Council Electricity Department's entry in a parade in connection with a local hospital carnival last Saturday, was awarded first prize in its class. Depicting a band in which the players used vacuum cleaners and other electrical apparatus for instruments, the exhibit carried an invitation to the public to "Join the Band" (of electricity consumers, presumably).



Simplicity is the keynote of this refrigerator window at the Newtown showroom of Electricity Distribution of North Wales and District, Ltd.

Wages in the Engineering Industry

At a meeting in London on June 10th, between representatives of the Engineering Employers' Federation and the engineering unions, the question of higher wages and a revision of the night-shift and overtime rates was considered and a joint recommendation was arrived at, which was to be reported to a conference of the executives of all the unions concerned on Wednesday last at York.

Chinese Radio Imports

According to the *Chinese Economic Bulletin* imports of radio sets and parts into China last year amounted to 2,210,978 gold units in value, as compared with 2,338,252 gold units in 1934. Japan increased its share in the business from 260,402 to 507,090 gold units, purchases from Great Britain declining from 308,612 to 246,851 gold units, and those from the United States from 1,505,771 to 980,218 gold units. Imports from Germany showed an advance from 155,829 to 170,641 gold units. Although radio receivers are constructed locally their sales compare unfavourably with those of imported sets.

Social Events

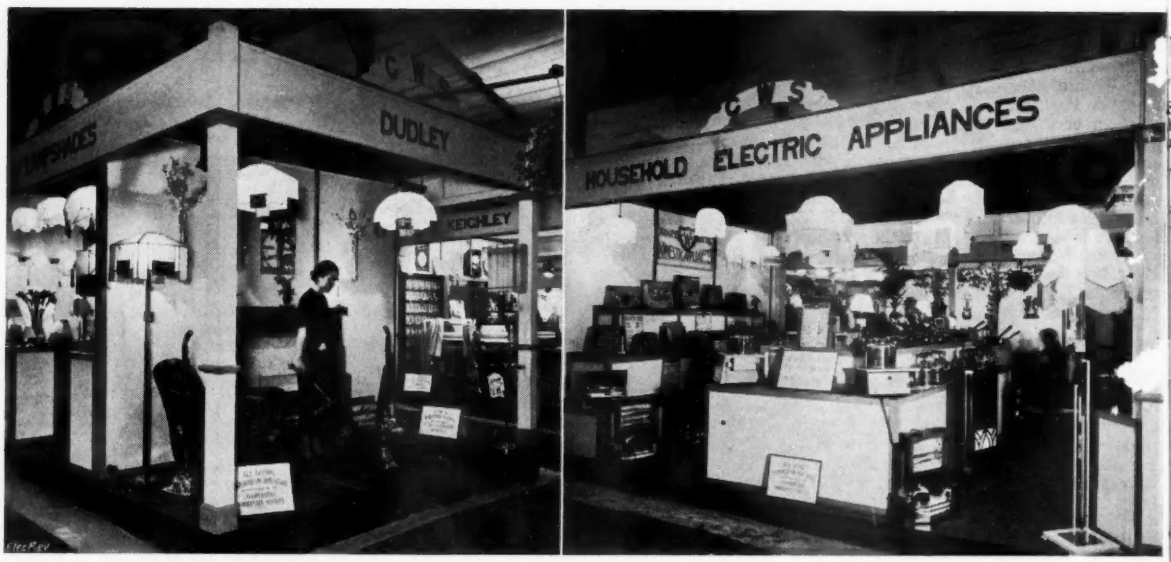
The sixth golf outing of the members of the Change of Frequency staff of the North-Eastern Electric Supply Co., Ltd., and representatives of motor manufacturers and contractors took place on June 7th on the Durham City course. Forty-seven players took part in the competitions which were against bogey. After tea Mr. Burns presided and the prizes were presented to the winners by Mrs. Monkhouse, who was accompanied by Col. S. E. Monkhouse, assistant general manager of the N.E.S. Co.

On June 6th the staffs of the branch offices at Bristol and Southampton of the Hotpoint Electric Appliance Co., Ltd., participated in a combined outing to the Cheddar Gorge, where they had lunch and tea. The accompanying illustration was taken during a tour of the famous Cheddar Caves.

On Saturday Messrs. A. Reyrolle & Co., Ltd., held their ninth annual sports which, in spite of the unfavourable weather, proved very successful. There were several hundred entries, and the value of the prizes, which were distributed by Mrs. Coates, wife of Mr. F. Coates, a director of the company, was about £100, several cups being given by directors. The sports revealed an outstanding runner in Mr. C. E. R. Langford, an employé of the company from South Africa, who won the half mile and mile races in very fast times.

Your Works and Ours

Under the title "Your Works and Ours," Messrs. R. A. Lister & Co., Ltd., of Dursley, Glos., have published a booklet on the history and progress of their company over seventy years, which they are presenting to each of their 2,500 employés at Dursley. Particulars are also given of the many welfare schemes in operation, while there are numerous illustrations of the company's works, its products, and the offices of its agents in various parts of the world.



Two views of the electrical exhibit at the Newcastle Congress exhibition

Fire at Ferranti Radio Works

The servicing and packing department of Messrs. Ferranti's radio factory at Moston, Manchester, was damaged by fire on Sunday last. Production has, however, not been interfered with.

Works Visits

The annual conference of the West Riding District Councils' Association which was held recently at Leeds, included a visit to the Ferrybridge power station of the Yorkshire Electric Power Co., where members saw the operation of a large modern plant which is amongst the most efficient in the country. The output of the company's three power stations last year was over 330 million kWh, and of this amount Ferrybridge contributed one-half. To meet the ever-growing demands for more electricity the station is to be largely extended. The site on which it is situated is exceptionally well-fitted for these developments and it is anticipated that the present 40,000-kW plant will be extended to 200,000 kW. An interesting feature of the visit was that the luncheon was prepared and cooked by the Power Company's lady demonstrators.

On June 9th Mr. B. S. B. Stevens, Premier of New South Wales, paid a visit to the Trafford Park works of the Metropolitan-Vickers Electrical Co., Ltd.

Strike at Aluminium Factory

Following the refusal of demands for the restoration of wage cuts imposed in 1932, holidays with pay and improvements in working conditions, employés at the British Aluminium Company's Lochaber works came out on strike on Sunday night.

Trade Announcements

Messrs. Sulzer Bros. (London), Ltd., state that they have acquired as a going concern the business of Messrs. Hathorn, Davey & Co., Ltd., Sun Foundry, Hunslet, Leeds. New machinery and equipment is being installed. This arrangement will not interfere with the manufacture by Hathorn, Davey & Co. of their own products as they will continue to maintain their separate connections.

Knightshades, Ltd., have removed their business to a new factory. Their address is now Derby Road Works, Montagu Road, Edminton, London, N.18. (Telephone: Tottenham 1967/8.)

The registered office of the Telegraph Construction and Maintenance Co., Ltd., the Selborne Plantation Co., Ltd., and Submarine Cables, Ltd., has been removed to 22, Old Broad Street, E.C.2. The telephone number remains unchanged.

On and after June 25th the offices of Messrs. Thompson & Co., will be at Kingsway Works, The Hyde, Hendon, N.W.9.

The Sutton Wholesale Electrical Co. is moving next Monday to George Street, High Street, Sutton, Surrey. The telephone number remains unchanged.

The Sullivan Machinery Company, makers of mining and quarrying equipment, have removed to new works—Grange Works, Grantham, Lincs (Telegrams: Sullimaco; Telephone: Grantham 595.)

C.W.S. Electrical Products Exhibited

In conjunction with the Co-operative Congress at Newcastle-on-Tyne during Whit week an exhibition of products of co-operative factories was held. Apart from being one of the largest exhibitions ever held in the North of England, it had particular interest in view of the comprehensive display of "Dudley-Electric" goods which occupied five stands. These goods were produced at the new C.W.S. National Works, Dudley, which we described in our issue of February 7th (p. 205), and included a complete range of domestic appliances, including electric breakfast cookers, imitation coal fires, convectors, fans, irons, boiling rings, lampshades and fittings. The new range of "Dudley-Electric" vacuum cleaners was shown, an outside bag type, and two cylindrical models. The greatest interest, however, centred upon the new "Dudley-Electric" washing machines. Two models of these robustly built machines were on show; the "Popular" (having a galvanised pan and wringer trays) and the "Standard" (having a vitreous enamelled pan and aluminium trays, &c.). Both machines have electrically driven wringers which can be removed and an electric ironer attachment substituted.

Prices of Materials

The following prices are only general, and they may vary according to quantities and other circumstances:—

CHEMICALS, ETC.	Price, June 17th.	Fortnight's Inc. or Dec.
a Acid, Oxalic ... ... per cwt.	50s.	—
a Ammoniac, Sal ... ... per ton	£36	—
a Ammonia, Muriate (large crystal) ... "	£18 10s.	—
a Borax ... ... "	£17	—
a Copper, Sulphate ... ... "	£15 10s.	—
a Potash, Chlorate ... ... per lb.	3¾d. to 4¼d.	—
a " Perchlorate ... ... "	6d.	—
a Shellac ... ... per cwt.	£4 18s.	—
a Sulphur Commercial ... ... per ton	£11	—
a " Roll ... ... "	£11	—
a Soda Chlorate ... ... per lb.	3¼d. to 3¾d.	—
a " Crystals... ... ... per ton	£5 to £5 5s.	—
a Sodium Bichromate, casks ... ... per lb.	4d. nett.	—
METALS, ETC.		
b Aluminium, Ingots ... ... per ton	£100 to £105	—
b " Wire ... ... per lb.	1/1 to 1/9	—
b " Sheet and Foil ... ... "	1/3 to 2/9	—
p Babbitts Metal and Anti-friction Metals—		
Grade I ... ... per ton net	£174	£9 dec.
Grade II ... ... "	£122	£5 dec.
Grade III ... ... "	£66	£2 dec.
c Brass (rolled metal 2" to 12" basis) ... per lb.	7⅞d.	¼d. dec.
c " Tubes (solid drawn) ... ... "	9¼d. to 10d.	—
c " Wire, basis ... ... "	7¾d.	—
c Copper Tubes (solid-drawn) ... ... "	10½d.	—
g " Bars (best selected) ... per ton	£68	—
g " Sheet ... ... "		
g " Rod ... ... "		
d " (Electrolytic) Bars ... ... "	£46 12s. 6d.	£4/17/6 inc.
d " " Wire Rods ... "	£46 12s. 6d.	£1/2/6 dec.
d " " H.C. Wire ... per lb	7¾d.	¼d. inc
f Ebonite Rod ... ... "	1/6 to 2/- plus	—
f " Sheet ... ... "	1/3 to 1/6 10%	—
n German Silver Wire ... ... "	2/5	—
h Gutta-percha, fine ... ... "	nom.	—
h India-rubber, Para-fine ... ... "	9¼d.	¼d. inc.
i Iron, Pig (Cleveland No. 3) ... per ton	67/6	—
i " Wire galv. No. 1, P.O. Qual.... "	£20	—
g Lead, English Pig ... ... "	£17	10s. dec.
g Mercury ... ... per bot.	£11/17/6 to £12/7/6	—
e Mica (in original cases) small ... per lb.	9d. to 1/6	—
e " " " medium ... "	5/- to 10/-	—
e " " " large ... "	10/6 to 17/6 up	—
p Phosphor Bronze, plain castings ... "	1/1	—
p " " drawn bars & rods "	11¾d.	—
p " " rolled strip & sheet "	11¼d.	—
p " " wire ... ... "	1/0¼d.	¼d. dec
o Platinum ... ... per oz.	£7	—
d Silicium Bronze Wire ... ... per lb.	8 7/16d.	¼d. dec.
g Spelter ... ... per ton	£13 15s.	8/9 dec.
r Steel, Magnet, in bars ... ... per lb.	7½d.	—
g Tin, Block (English) ... ... per ton	£181 10s.	£20/10 dec.
n " Wire, Nos. 1 to 16 ... ... per lb.	3/8	—

Quotations supplied by:—

a G. Boor & Co.
b The British Aluminium Co., Ltd.
c Thos. Bolton & Sons, Ltd.
d Frederick Smith & Co.
e F. Wiggins & Sons.
f India Rubber, Gutta Percha and Telegraph Works Co., Ltd.
g Henry Gardner & Co., Ltd.
h Edward Till & Co.
i Bolling & Lowe.
n P. Ormiston & Sons.
o Johnson Matthey & Co.
p C. Clifford & Sons, Ltd.
r W. F. Dennis & Co.

The above table is published here fortnightly. In alternate issues, in which it does not appear, the latest prices of copper, silicium bronze wire, lead, rubber, tin and spelter, up to the time of going to press, are given in our "Business Notes" under the same heading.

New Catalogues and Lists

Hanovia, Ltd., Bath Road, Cippenham, Slough.—A leaflet dealing with an analytic lamp for fluorescence tests.

Rapid Magnetting Machine Co., Ltd., Magnet Works, Lombard Street, Birmingham, 12.—Leaflets illustrating the company's lifting magnets, magnetic chucks, screening machines, magnetic separators, clutches, &c.

Drake & Gorham Wholesale, Ltd., 77, Long Acre, London, W.C.2.—Catalogues of electric refrigerators and fans.

Parsons Oil Engine Co., Ltd., Town Quay Works, Southampton.—A catalogue of "ten-twenty" petrol and kerosene engines.

James Neill & Co. (Sheffield), Ltd., Composite Steel Works, Napier Street, Sheffield, 11.—A catalogue of non-electric magnetic chucks.

Ferguson, Pailin, Ltd., Higher Openshaw, Manchester, 11.—New catalogue sections relating to oil circuit-breakers, a duplicate bus-bar metal-clad unit and a draw-out metal-clad unit.

Royce, Ltd., Crane Works, Loughborough.—An illustrated catalogue dealing with an enclosed gear electric crane.

Johnson & Phillips, Ltd., Charlton, London, S.E.7.—A booklet illustrating and describing "Charlton" circulators and immersion heaters.

J. H. Tucker & Co., Ltd., King's Road, Tyseley, Birmingham, 11.—A card giving a specification of "Titan" 15 A iron-clad switch splitters.

Ferranti, Ltd., Moston.—A coloured illustrated art catalogue of the company's latest all-wave radio receivers.

General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.—Leaflets describing the "Battery T.R.F.3" and "A.C. Super 4" radio receivers.

George Ellison, Ltd., Perry Barr, Birmingham, 20.—Two booklets—a new and revised edition of "The installation and maintenance of Ellison flameproof switchgear," now including hints on the maintenance of the flameproof lantern and transformer; and a new booklet, "Hints on Machining 'Tufnol,'" published for "the man in the shop."

Bankruptcy Proceedings

A. M. Gibson and **W. R. F. Gibson,** carrying on business in partnership as Gibsons Wireless, 94, Tavistock Road, Plymouth; 15, Exeter Road, Exmouth, Devon; and 15, Bank Street, Teignmouth, Devon.—These debtors applied for their respective discharges at the Western Law Courts, Guildhall, Plymouth, on June 10th. The receiving order had been made in 1933. The Official Receiver reported that at the date of the receiving order there was a joint deficiency of £1,611. A first and final dividend of 4s. in the £ had been paid on proofs for £2,156. With regard to the separate estates, the elder debtor had paid all his private liabilities in full, but the younger debtor's assets had realised only sufficient to distribute a dividend of 6d. in the £ to his creditors. The Judge granted the elder debtor his discharge at the end of six months, and adjourned the son's case for the same period.

A. P. Steer, 73a, Fore Street, Bovey Tracey, Devonshire, formerly Station Road, Bovey Tracey, wireless dealer.—The public examination herein was held on June 11th at the County Court Offices, Old Town Hall, Torquay. Debtor, whose deficiency amounted to £415, attributed his failure to liability to his late partner, lack of capital, competition, bad debts and losses through customers defaulting under hire-purchase agreements, and other causes. The examination was closed.

Gilbert Lewis Electric Co. (a firm), 66, Douglas Road, Acocks Green, Birmingham, and 4, Hurdis Road, Shirley, Warwickshire, electrical appliance dealers.—The first meeting of creditors was held on June 15th at the Official Receiver's Office, 159, Gt. Charles Street, Birmingham, when it was disclosed that the liabilities amounted to £203, and the deficiency to £179. The failure was attributed to insufficient capital. The case was left in the hands of the Official Receiver.

Gertrude H. Honeysett (married women), radio dealer, trading as Honeyset Radio, 71a, Manchester Road, Poplar, E.—The statutory first meeting of creditors was held on Monday at London Bankruptcy Buildings before Mr. S. W. Hood, Official Receiver. The receiving order was made on the petition of Hassell & Russell, Ltd., creditors for £210, and the debtor was adjudged bankrupt on June 2nd. The case remained in the hands of the Official Receiver to be wound up in bankruptcy.

J. W. P. Swale, radio and electrical engineer and dealer, 28, Dalton Green Lane, Huddersfield, Yorkshire, lately carrying on business at 59, Wakefield Road, Moldgreen, Huddersfield.—The public examination was held at the County Court, Queen Street, Huddersfield, on June 10th, when the statement of affairs filed showed ranking liabilities of £496 and a deficiency of £393). Debtor attributed his present position to hire-purchase transactions, bad debts, and incompetent control of accounts. The examination was closed.

J. G. Raad, wireless dealer, 62, Stamford New Road, Altrincham, Cheshire, trading as Rardo Radio and Television Co.—A receiving order was made on the debtor's own petition, and he has lodged a statement of affairs showing gross liabilities of £637, of which £268 is expected to rank for dividend. The net assets amount to £308, leaving a surplus of £40. The debtor attributes his position to falling off in trade, inexperience of the business, ill-health and inability to sell a property on which he holds a mortgage for £700.

A. Boards, radio dealer, 253, Barlow Moor Road, Chorlton-cum-Hardy, Manchester.—Receiving order made June 4th on debtor's own petition.

G. W. Lambert, electrician, 3, Ontario Street, Southwark, S.E.—Application for discharge to be heard on July 3rd at Bankruptcy Buildings, Carey Street, W.C.

A. Hunt, wireless dealer, 2a, Eldon Street North, Barnsley.—Trustee, Mr. B. S. Briggs, 13, Burton Street, Wakefield, Official Receiver, released May 26th.

G. Inman, radio dealer, 121, Overton Road, Sheffield.—Trustee, Mr. L. J. Clegg, 14, Figtree Lane, Sheffield, Official Receiver, released May 26th.

L. L. Morgan, radio and electrical engineer, 7, High Street, Purley.—Trustee, Mr. C. R. Waterer, 29, Russell Square, W.C., Official Receiver, released May 19th.

W. H. Colman, electrical and radio engineer, c/o 37, Rowlands Road, South Yardley, Birmingham.—Last day for receiving proofs for dividend June 29th. Trustee, Mr. R. K. Clark, 159, Great Charles Street, Birmingham, Official Receiver.

H. Hawkins, wireless dealer, 171a, King Street, Fenton, Stoke-on-Trent.—Trustee, Mr. F. C. Ormrod, 12, Lonsdale Street, Stoke-on-Trent, Official Receiver, released May 27th.

E. Leighton, wireless dealer, 497, Hessle Road, Hull.—Trustee, Mr. J. E. D. Stickney, 1, Parliament Street, Hull, Official Receiver, released May 11th.

A. Marcus (Radio & Electric Store), 58, Beatty Avenue, Matthew Bank, Newcastle-upon-Tyne.—Trustee, Mr. P. J. McLellan, 81, St. Mary's Place, Newcastle-on-Tyne, Official Receiver, released May 22nd.

T. H. D. Pope, electrical engineer, 119, Commercial Road, and 10, Regent Circus, Swindon.—Trustee, Mr. H. Wheeler, 26, Baldwin Street, Bristol, Official Receiver, released May 13th.

Midland Electrical Installations, a firm (other than S. Hinchliffe), electrical engineers, 443, Meadow Lane, Nottingham.—First meeting June 23rd at 22, Regent Street. Park Row, Nottingham. Public examination July 2nd at the County Court House, Nottingham.

E. H. Newman and **D. E. Newman** (Newman & Co.), radio and electrical engineers, 17, Shepherd's Bush Green, London (separate estate of E. H. Newman).—First and final dividend of 20s. in the £, payable at Bankruptcy Buildings, Carey Street, W.C.

Company Liquidations

Cliffdown Appliances, Ltd., 12, Victoria Street, S.W.1.—The statutory first meetings of creditors and shareholders under the compulsory liquidation of this company were held on June 11th at the Board of Trade Offices, Carey Street, W.C., before Mr. J. Barwick Thompson, Official Receiver. The winding-up order was made on the petition of Messrs. Henry Righton & Co., Ltd. The company was registered in December, 1933, as Cliffdown Electrical Appliances, Ltd., the present trading style being adopted in January, 1935. It was formed to take over the business of Brice (Electrical), Ltd., of Hastings, who traded in electrical plant, fittings and manufactures. A receiver was appointed on behalf of the debenture holders in June, 1935, following pressure and executions by creditors, and eventually a winding-up order was made at the instance of creditors. No statement of affairs has yet been lodged, but the liabilities amount roughly to £3,705, against assets estimated at £300. As the proceeds of the assets will not discharge all the debentures, there is no prospect of any dividend becoming available for the unsecured creditors. The failure of the company is attributed to lack of adequate capital. In the absence of any resolutions the liquidation was left in the hands of the Official Receiver.

Moffatt & Wheatley, Ltd., radio engineers, Blackfriars Street, Carlisle.—At the recent statutory meeting of creditors it was reported that the shareholders had passed a resolution nominating Mr. H. J. Rigg as liquidator of the company. A statement of affairs was submitted which disclosed liabilities of £973 and a surplus of assets over liabilities, subject to realisation and the costs of liquidation, of £202. The creditors passed a resolution confirming the appointment of Mr. Rigg as liquidator of the company, with a committee of inspection.

British Crystal Lamp Co., Ltd., 16, Northumberland Avenue, London, W.C.—The statement of affairs filed in the compulsory liquidation shows gross liabilities of £23,080 (ranking £16,399) and assets of £6,631, absorbed, however, by debenture and preferential claims. The principal creditors are:—Burchells, £87; Braemore Trading Co., Ltd., £3,102; A. H. Cooper & Sons, Ltd., £116; Cohen & Cohen, £500; John Ismay & Sons, Ltd., £7,816; Northern Electrical Distributors, £587; Smith & Harting, £100; debentures, £10,457.

C. T. Colbery & Co., Ltd.—Winding up voluntarily. Liquidator, Mr. C. H. Ansell, 19, Broad Court, Bow Street, W.C. Particulars of claims to the liquidator by July 6th.

Braunton Electric Light & Power Co., Ltd.—Winding up voluntarily. Liquidator, the Hon. H. N. Morgan-Grenville, 47, Parliament Street, S.W.

Cardiff Tramways Co., Ltd.—Winding up voluntarily. Liquidator, Mr. E. J. G. Webb, 1, Queen Victoria Street, E.C.

Hampshire Light Railways (Electric) Co., Ltd.—Winding up voluntarily. Liquidator, Mr. E. J. G. Webb, 1, Queen Victoria Street, E.C.4.

Gosport and Alverstoke Electric Lighting Co., Ltd.—Winding up voluntarily. Liquidator, Mr. E. J. G. Webb, 1, Queen Victoria Street, E.C.4.

Car Electrical Maintenance Co., Ltd.—Meetings July 17th at 8, Queen Street, Cheapside, E.C.4, to receive an account of the winding up by the liquidator, Mr. E. F. Wilkins.

Private Arrangements

G. Casperson, electrical engineer, Park Square, Leeds.—A meeting of creditors was held recently at the Law Institute, Leeds, when the statement of affairs showed ranking liabilities of £2,450. After allowing £139 for preferential claims the net assets were £1,377, leaving a deficiency of £1,073. It was stated that the business had been in existence for about thirty years, but had been affected by lack of working capital. There were a number of substantial orders in hand or in prospect and the business was a good one, which, it was believed, could be carried on profitably in future. The statement of affairs showed a dividend of about 10s. 3d. in the £, and an offer was made of a composition of that amount, payable in cash. It was further stated that a company would be formed to carry on the business. A resolution was unanimously passed agreeing to accept the offer.

M. Cohen, trading as Macks Wireless Stores, 29, Hare Street, Bethnal Green, London, E.2.—At a meeting of the creditors held recently the statement of affairs showed ranking liabilities of £216. After allowing £32 for preferential claims the net assets were £34, leaving a deficiency of £182. In the absence of any offer it was decided that the matter should be dealt with under a letter of authority to Mr. Fraser, of 54-55, Finsbury Court, Finsbury Pavement, London, E.C.

Electricity Supply

Lighting, Domestic, Power

Aberdeenshire.—STREET LIGHTING.—Owners and occupiers of property in the villages of Maud and New Deer, Aberdeenshire, have decided to adopt the Grampian Electricity Supply Co.'s scheme for street lighting.

Bangor.—CHEAP ELECTRICITY FOR WATER HEATING.—A recommendation for the supply of electricity for water heating during the summer months at ½d. per kWh has been adopted by the Electricity Committee. From March 1st to October 30th the maximum-demand charge does not operate, and the bulk-supply "unit" rate of 0.25d. to 0.27d. leaves a satisfactory margin of profit. Immersion heaters can be supplied and fitted to household water systems at a hire-purchase charge of 4s. per quarter.

Bath.—MAINS AND SUB-STATIONS.—The City Council has applied for a loan of £10,900 for high voltage mains and sub-stations in connection with extensions.

Blackburn.—ANNUAL REPORT.—An increase in the amount of electricity sold during the year greater than any previous figure is shown in the annual report of the electricity undertaking, up to the end of March last, which has just been issued by Mr. R. H. Harral, the borough electrical engineer and manager. The increase was 5,544,408 kWh, which is equal to 16.29 per cent. A large number of domestic consumers have changed over from the ordinary heating and lighting rates to the "all-in" domestic tariff, accompanied by a substantial increase in the number of appliances connected. The amount of electricity sold per head increased from 160½ kWh in 1931 to 259½ kWh in 1936, and the number of consumers from 13,698 to 24,093 during the same period. The assisted-wiring scheme continues to progress, about 1,000,000 kWh being consumed under this heading. It is also interesting to note that, while the total connections have increased from 46,465 kW in 1929 to 76,916 kW in 1936, the actual maximum supply demanded decreased during the same period from 17,015 kW to 15,870 kW.

Bradford.—SAFEGUARDING THE SUPPLY.—The proposals for the installation of new plant detailed in our issue of June 5th, arising partly from the recent breakdown at the Valley Road power station, have now been approved by the City Council.

Brechin.—ELECTRICITY TO REPLACE GAS.—The Town Council has agreed that electric lighting shall be installed at the Cookston Road, Gallowhill and Hillview housing estates in place of gas.

Bridport.—EXTENSION OF SUPPLY.—The output of the undertaking is to be supplemented by the Town Council by taking part supplies from the grid. The Council is extending its supply area to Charmouth.

Cannock.—SUPPLY EXTENSIONS.—A scheme for the supply of electricity to prospective consumers in the areas of Longridge, Preston Hill, Dunston Heath, Coppenhall, Congreve, Beacon Hill, Preston Vale, Winston, Witton and Levedale has been approved by the Electricity Committee, and tenders have been accepted for the supply of the necessary cables, switchgear and transformers, amounting to a total cost of £8,000.

Colchester.—SUB-STATIONS.—A scheme has been prepared for improvements and new sub-stations costing £8,848.

Croydon.—FIRST STAGE OF PURLEY WAY LIGHTING SCHEME COMPLETED.—Over half a mile of Purley Way, Croydon, has just been equipped with the latest type of "Philora" sodium vapour electric-discharge lamps as the first stage of the whole four miles of the road. Purley Way was the first road in the country to have this type of lighting, an experimental stretch being completed in 1932. Philips Lamps, Ltd., are responsible for the installation, which is being carried out under the direction of Mr. F. N. Rendell-Baker, the borough electrical engineer.

Sodium lighting at Purley Way

A LARGE WATER-HEATING INSTALLATION.—A 4,000-kW electric thermal-storage scheme submitted by the borough electrical engineer for the heating and domestic hot-water services in connection with the Queen's Road Homes, Croydon, has been approved. It provides for two 2,000-kW, 6,600-V electrode water-heaters with automatic load-control equipment and electrical thermal-storage vessels. The cost of the scheme, including the incidental builders' work, is estimated at £18,790, and the consumption of electricity at 3,500,000 kWh per annum, to be taken during off-peak hours.

Dorchester.—LIGHTING TARIFF.—The Town Council has reduced the flat rate for lighting from 7d. to 6½d. per kWh, and the two-part tariff "unit" charge for shops, offices, &c., from 1½d. to 1¼d.

METERS.—A loan of £1,000 for meters has been applied for.

Douglas (I.O.M.).—EXTENSIONS.—The Electricity Committee has obtained sanction to borrow £39,000 for extensions.

East Ham.—SUPPLY TO CINEMA.—Cabling and equipment costing £1,489 are to be provided by the Corporation in connection with a supply to the Granada Cinema, Barking Road.

SUB-STATION.—In order to provide a supply to a foundry at Beckton Road, the Electricity Committee is to erect a sub-station at a cost of £4,518.

Gainsborough.—OVERHEAD LINES.—The Rural District Council has consented to the erection of overhead lines at Fenton and Torksey by the North Lincolnshire & Howdenshire Electricity Co., Ltd.

Gillingham (Kent).—SUPPLY TO MERESBOROUGH.—A supply of electricity is to be given to the Meresborough area by the Town Council at an estimated cost of £1,200.

Glasgow.—NEW WORKS.—Sanction has been obtained by the Electricity Committee to loans of £36,900 and £48,700 for mains and sub-station equipment.

Hastings.—SUPPLY TO BRICKWORKS.—At a cost of £2,160 a supply is to be given by the Electricity Committee to new brickworks at Ninfield, to be established by the Ninfield Brick & Tile Co., Ltd.

Japan.—PROPOSED NATIONALISATION OF ELECTRIC POWER INDUSTRY.—It is considered doubtful in Tokyo whether the proposals for the nationalisation of the electrical industry will be carried out at present. A *Reuter* message states that the military party is said to be pressing the vested interests to oppose the scheme. The Ministry of Communications is stated to be vacillating, and there is considerable doubt whether the Government, at the moment, would be able to finance the taking over of capital and investments totalling 4,900,000,000 yen. The question of external bonds is not brought up in the draft scheme, which contains a Government guarantee to pay dividends on the ordinary shares of the companies absorbed at 2 per cent. higher interest than Government bonds.

Kendal.—LOWER CHARGE.—The Corporation has reduced the flat-rate charge for the first 400 kWh from 6½d. to 6d. per kWh and the "unit" charge of the domestic tariff from ¾d. to ½d. The "unit" charge for business premises is reduced to ¾d.

Kirkintilloch.—HOUSE INSTALLATIONS.—The Town Council is to install electricity in 236 houses on the Back o' Loch estate at an estimated cost of £1,766.

Lichfield.—FRINGE ORDER.—In order to supply premises in Hamstall Ridware, the Electricity Committee has obtained a Fringe Order.

Liverpool.—ARTERIAL ROAD LIGHTING.—Sodium electric-discharge lighting has been installed along just over half a mile of the East Lancashire arterial road, and it is proposed ultimately to provide similar lighting along the whole three miles of the road within the city. Sodium lighting was introduced into Liverpool last year, and was referred to by Mr. P. J. Robinson, city electrical engineer, at the I.M.E.A. Convention.

TRAMWAY TARIFF.—A reduction of £10,000 per annum in the rates for electricity for operating the tramway system has been offered by the Electric Light and Power Committee. The Passenger Transport Committee, however, is not satisfied and has forwarded the particulars of a large number of passenger transport undertakings in this country which are supplied with energy for traction at a lower cost.

POWER CONCESSION.—For power the fixed annual charge of £12 per kW is to be reduced to £10 per kW.

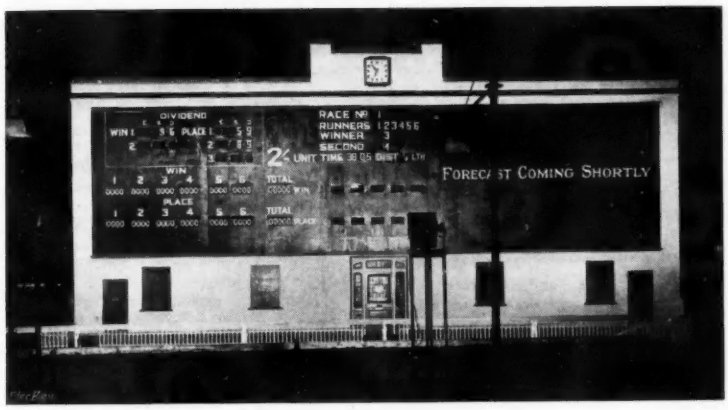
CABLE EXTENSIONS.—A high-voltage feeder is to be laid to cope with the development in the demand in the Carr Lane, Gillmoss Lane and East Lancashire Road districts, at an estimated cost of £5,270. It is also proposed to lay high-voltage mains between Pumpfields and the Beaumaris Street sub-station at an estimated cost of £4,550.

Other plans include the laying of high-voltage cables from Clarence Dock power station to Marsh Lane sub-station, Liverpool, subject to the approval of the Economy Committee. Tenders are to be obtained for the supply of cables. High- and low-voltage mains are also to be extended in the Huyton and Roby districts at an estimated cost of £14,490.

Middlesbrough.—BULK SUPPLY.—Owing to the increased demand for electricity the Town Council has decided to open negotiations with the North-Eastern Electric Supply Co., Ltd., for additional bulk supplies. Application is being made for sanction to borrow £12,500 for this purpose.

Portsmouth.—WIRING INSTALLATIONS.—Sanction to a loan of £50,000 for wiring installations has been obtained by the Electricity Committee.

Romford.—A FLOODLIGHTED TOTALISATOR.—An up-to-date example of modern floodlighting is now to be seen at the Romford greyhound track, where the totalisator has been floodlighted with " Royal Ediswan Escura " electric-discharge



The floodlighted totalisator at Romford

lamps in " Sirius H " projectors. It is possible to see the board from any part of the arena. The installation was carried out by Messrs. Leggett & Partners, of Romford.

Saltcoats (Ayrshire).—ELECTRIC LIGHTING FOR COUNCIL HOUSES.—It has been agreed to install electric lighting in all Council houses not already provided for at an estimated cost of £997.

Sheffield.—MORE ELECTRIC STREET LAMPS.—Although there is still a preponderance of gas over electric street lamps in Sheffield, the margin between them is steadily being reduced. During the year ended March 31st last the Lighting Department, of which Mr. J. F. Colquhoun is the engineer, resumed its programme of installing electric lighting along the main traffic routes, 500-W lamps housed in lanterns fitted with asymmetric refractors being most commonly used. At the end of the financial year there were 232 lamps of this wattage against 109 a year before; two of them were combined mercury electric-discharge and filament lamps. In all there were 7,071 electric lamps in use, an increase of 747 during the year, while the consumption rose by 564,900 kWh to 2,928,212 kWh. On the other hand, the number of gas lamps decreased by 288 and the consumption by nearly 270 million cu. ft. With regard to maintenance, 23,009 electric lamps were replaced during the year, and with no adjustment for mechanical breakages, the average life per lamp was 1,187 burning hours. It is the practice of the Department to test all lamps for compliance with the B.S.S., and of the 25,226 lamps so treated 1,784 were rejected, mainly as being deficient in light output. Further tests were carried out on 1,158 lamps during life to ensure that the B.S.S. requirements were maintained. These showed that, with between 100.5 W and 103.5 W initially, the average throughout their life was between 99 W and 100.9 W, the initial lumens per watt being from 12.2 to 13.2 and the average during life between 11.2 and 12.3.

MAINS EXTENSIONS.—The Electricity Committee is to extend mains at a cost of £3,585.

Sleaford.—NO SALE OF UNDERTAKING.—A proposal for the sale of the undertaking to the Mid-Lincolnshire Electric Supply Co., Ltd., has been refused by the Electricity Committee.

Spalding.—MAINS AND SERVICES.—The Urban District Council has applied for a loan of £10,000 for mains and services.

Stowmarket.—REVISED CHARGES.—The East Anglian Electric Supply Co., Ltd., is making the following alterations in its tariffs as from June 30th: Flat rate for lighting reduced from 10d. to 9d. per kWh; small power rate, first 500 kWh per quarter, 4d. per kWh; next 4,500 at 2½d.; beyond, at 2d. The latter rates do not affect the urban district of Braintree and Bocking. Supplies for motors for farming purposes, daylight use, are to be charged at 2d. per kWh.

Sunderland.—NEW MAINS.—Nearly £1,400 is to be spent by the Town Council on the replacement of cables in Belford Terrace and in The Elms and The Elms West.

Swinton and Pendlebury.—CHANGE-OVER.—The Corporation has applied for a loan of £3,000 to complete the change-over.

Taunton.—ELECTRIC-DISCHARGE LIGHTING.—Following experiments, it has been decided to illuminate the main shopping streets by means of mercury electric-discharge lamps, at an estimated cost of £2,500.

Todmorden.—PURCHASE OF APPARATUS.—The Electricity Committee has obtained sanction to borrow £10,000 for consumers' apparatus.

Torquay.—PURCHASE OF UNDERTAKING.—The Electricity Committee has reported that the purchase by the Corporation of that part of the undertaking of the Teignmouth Electric Lighting Co., Ltd., which is situated in the parishes of Haccombe-with-Combe and Stoke-in-Teignhead as constituted prior to the passing of the Devon Review Order, 1935, has now been completed. The committee is to make application for sanction to borrow £8,080 to cover the cost of the acquisition.

Walsall.—INCREASED OUTPUT.—The Electricity Department's report for the past year shows that the income per kWh sold fell from 1.25d. to 1.15d., while the sales of electricity increased by 21 per cent.

Wallsend-on-Tyne. — CABLE LAYING. — The Town Council has approved plans by the North-Eastern Electric Supply Co., Ltd., for low-voltage cables in King's Road and Mullen Road, Wallsend.

West Country.—LOWER CHARGES.—The Wessex Electricity Co. and associated companies are reducing the " unit " charge on the two-part tariff for private residences and business premises from 1¼d. to 1d., as from July 1st.

Whitby.—LOWER CHARGES.—The cost of electricity for water-heating installations of 5 kW or more has been reduced to ½d. per kWh, and similarly for churches and baking ovens rated at 10 kW or more.

SALE OF UNDERTAKING UNDER DISCUSSION.—The Urban District Council has agreed to meet representatives of the Centropolis Public Works Co., Ltd., regarding the sale of the municipal electricity undertaking to the company. The decision must not be taken as an acceptance of the scheme.

Wiltshire.—REDUCED CHARGES.—The West Wilts Electric Light & Power Co., Ltd., is reducing the " unit " charge under the two-part tariff for domestic and business consumers from 1¼d. to 1d. as from July 1st.

Winchester.—ELECTRICITY AT OTTERBOURNE.—The Rural District Council has consented to the use of overhead lines at Otterbourne by the West Hants Electricity Co.

Wolverhampton.—SUB-STATIONS.—Additional substations are to be provided in Willenhall Road at a cost of £930 and at Marsh Lane (£1,887).

Worthing.—ELECTRICITY FOR PUMPING.—The Corporation is to install electrical plant at the Sea Lane pumping station at a cost of £1,054.

An example, produced by E.L.M.A., of a type of shop-window display suitable for a " Lighting and Eyesight " campaign

Traction

London.—SUGGESTED TUBE EXTENSION TO CAMBERWELL.—In view of traffic difficulties experienced at Camberwell during "rush" hours a deputation is to be sent to the London Passenger Transport Board and to the Ministry of Transport, urging that the scheme for the extension of the underground railway system from the Elephant and Castle station to Camberwell Green, powers for which were obtained five years ago, should be revived. The cost of the new line, which would be 1¾ miles long, is estimated at £1,875,000.

TRAFFIC COMMISSIONERS AND TROLLEY-VEHICLES.—At the conclusion of the consideration of the Huddersfield Corporation Trolley Vehicles Bill, the chairman of the Select Committee said that, although a clause could not be inserted giving the Traffic Commissioners powers over trolley vehicles, a special report was to be made by the Committee recommending that the question of extending the system of control by the Traffic Commissioners should be seriously considered.

Russia.—IMPORTANT ELECTRIFICATION SCHEME.—The whole of the railway between Leningrad and Murmansk (a port on the Arctic Ocean) is to be electrified, the total length of the line being 840 miles. Power is to be obtained from hydro-electric stations in the region.

Communications

Denmark.—INTERNATIONAL CONFERENCE.—At the International Telephone Conference which opened in Copenhagen last week Lieut.-Col. A. G. Lee, engineer-in-chief of the General Post Office, represents Great Britain. Other delegates include representatives from Germany, France, Switzerland, Japan, Russia and the United States. The conference will discuss various international aspects of the telephone system and, in particular, long-distance radio-telephony. It was opened by M. Mondrup, the director of the Danish Post Office, who is presiding.—*Reuter.*

Germany.—TWO NEW TELEVISION STATIONS.—Following the Reich Post Office's successful experiments with television apparatus on the Brocken peak of the Harz mountains this spring, similar experiments have now been successfully concluded on the Feldberg (Taunus), says a Berlin message to the *Deutsche Bergwerks Zeitung*, quoted by *Reuter's Trade Service*. The building of two new television stations on the Brocken and the Feldberg will be put in hand shortly. They are expected to begin operating experimentally in 1937. The Feldberg station will have a range of about 80 km. to the north and about 100 km. in the Rhine district, thus including a number of important towns.

Great Britain.—CHEAPER TELEPHONE RATE.—A reduced telephone rate between Great Britain and Brazil, namely, £1 per minute, is to apply on Saturdays.

TELEPHONES.—During a luncheon celebrating the inauguration of the Loughborough automatic telephone exchange, Lt.-Col. E. T. Crutchley, Public Relations Officer, said that the Post Office had prepared an extensive programme of telephone development which would involve the expenditure of over £4,500,000 on underground cables and equipment. It was estimated that since the reductions in charges in October, 1934, 270,000 new subscribers had been added to the system. In 1922 there were one million telephones in operation; to-day the total exceeds 2,600,000.

GOVERNMENT'S ACTION ON ULLSWATER REPORT.—In the House of Commons this week the Postmaster-General (Major Tryon) stated that he hoped very soon to be able to announce the Government's proposals with reference to the report of the Ullswater Committee. He would consider arranging for their publication at an early date, so that there might be an opportunity of studying the policy proposed before a further debate took place.

TELEVISION THEATRES IN LONDON.—According to a special correspondent of the *Daily Telegraph* it is probable that, before the end of the year, passengers at the London railway termini will be able to go into a television theatre in the stations. In the initial stages the theatres would be very dimly lighted, and there would be five rows of eight seats each, the front row being 5 ft. from the picture.

New Zealand.—BROADCASTING REFORMS.—According to a *Reuter* message from Wellington, radical changes are to be made in the present system of broadcasting. The reforms are embodied in a Broadcasting Bill, which has passed its third reading in the House of Representatives, and includes the appointment of a director of broadcasting and the establishment of a Broadcasting Council of five. Other provisions of the Bill are: Subsidies to "B" stations from licence fees, but no increase in the number of these stations; and powers to establish commercial stations to be called "C" stations, to be owned and controlled by the Government, which will have the sole right to advertise.

South Africa.—BROADCASTING BILL.—The Senate has approved the third reading of the Broadcasting Bill without material alteration, states *Reuter* from Capetown. The Bill proposes the establishment of an African Broadcasting Corporation on the general lines of the B.B.C. During its progress through the two Houses an amendment providing for the broadcasting of political speeches by accredited party leaders was deleted, and a further amendment that all governors of the proposed Corporation should be fully bilingual was defeated. The Bill will now be reported back to the House of Assembly and then forwarded to the Governor-General for signature. A sum of £150,000 is laid down by the arbitrator as a fair amount to be paid by the Union Government to the African Broadcasting Company in full settlement for the whole of its undertakings. The original claim made by the company was for £284,917, but during the arbitration proceedings the amount of the claim was reduced to £242,839. For the Government it was contended that the amount to be paid should not exceed £60,922. The effect of this award is that the company will receive 6 per cent. debentures for £150,000, and the Corporation will take over all assets (including cash amounting to £45,761) and liabilities except claims for damages. Apart from the £150,000 which is being paid for the business, it does not appear to be necessary to provide any further working capital as the cash which is being taken over, plus the ordinary revenue of the company and the profits which are being earned, should be ample.—*Reuter.*

A Busy Year in Manchester

INFORMATION showing the extent of electrical activity in Manchester during the past year is contained in the recently published annual report on the working of the electricity undertaking, of which Mr. H. C. Lamb is the chief engineer and manager. Development has proceeded faster than ever, 16,941 consumers being added (the largest number in any single year); at March 31st last the number was 133,074.

An encouraging aspect is the growth of industrial power sales amounting to 27¾ million kWh, or 12 per cent., especially as no outstanding new industries have been started in Manchester during the year. The cotton mills shared in this to a limited extent, but by far the largest increase in electricity consumption was in engineering (27.3 per cent.). A feature of the year was the increased interest shown in industrial heating furnaces. Presumably the excellent results achieved are attributable in some measure to the propaganda carried out by the Department. Four series of demonstrations for industrial users were held with marked success.

Progress in the adoption of domestic electrical appliances has continued apace, 2,403 additional cookers being connected (total in service, 19,059), as well as 614 wash-boilers (total 2,391) and 973 water-heaters (total 3,123). The increase in connections was 14.6 per cent. as compared with 13.8 per cent. in the previous year, and the load at March 31st last was 293,036 kW.

Another avenue for increased sales is public lighting. The number of new lamps installed (838) again exceeded any previous year, and it is of interest that the whole of the main roads in the Audenshaw urban district are now illuminated by electric-discharge lamps.

Although bulk supply sales to other undertakings decreased by 23 million kWh, or 20 per cent., mainly owing to the transfer of part of the Stretford supply to the C.E.B., and nearly two million kWh less was sold for street traction, the total sales (excluding exports to the C.E.B.) rose by 19 million kWh (4 per cent.) to 498 million kWh. Electricity generated amounted to 788 million kWh against 642 million kWh in 1934-35, and the net export to the C.E.B. was 162½ kWh (45 million kWh). The maximum load on the power stations as a whole was reduced from 206,800 kW to 195,230 kW, and on the C.E.B. portion from 25,000 kW to 12,600 kW. Revenue showed a net increase of £109,456 (6 per cent.) and for the first time the income from all sources exceeded £2,000,000 (£2,067,111 against £1,955,691 in 1934-35) excluding the yield from export to the C.E.B. Expenditure amounted to £1,449,981 (against £1,474,793), and the gross balance was £617,130 (£480,898). There was a net surplus of £129,010 (£66,532). The average price obtained per kWh (excluding C.E.B. supply) was 0.95d. (0.93d.).

There have been large plant extensions. At Stuart Street two additional boilers were put into commission and a 30,000-kW turbo-generator was installed, while a new switch-house and a second cooling tower were completed. Two 25,000 kVA transformers connecting the station with a 30,000 V transmission system replaced 8,500 kVA units. At Barton two large brick chimneys were erected to supersede thirteen steel ones, and arrangements have been made for the completion of the station by the installation of a 50,000-kW turbo-generator, two additional boilers, switchgear and auxiliary plant. Other constructional work appertains to sub-stations (seventeen new buildings and forty-two extensions) and mains, the net additional length laid being 125½ miles. The supplies to the premises of 4,313 consumers were changed from d.c. to a.c., making the total number dealt with 34,335.

Contract Information

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses

Contracts Open

Aberdare.—June 23rd. U.D.C. Electricity Department. H.v. cable and switchgear. (June 5th.)

Argyll.—County Council. Electric lighting and heating installations at Kirn Public school. County architect, Dunoon (deposit £1 1s.), by June 30th.

Barking.—June 30th. Electricity Department. One portable oil purifying set. (See this issue.)

Barnstaple.—July 13th. Corporation. Two 450-kW Diesel-driven alternators and accessories for the Castle Street power station. (June 12th.)

Beckenham.—June 29th. Borough Council. Coal for the generating station. (June 12th.)

Bexley.—July 3rd. U.D.C. Cables for one year. (See this issue.)

Birmingham.—July 14th. General Purposes Committee. Electric lighting, power, bells, &c., and hot-water heating apparatus, domestic hot-water service and air-conditioning plant at the new Coroner's Court building, Newton Street. F. H. C. Wiltshire, town clerk, Council House (deposit £2 2s.), by June 26th.

Bridport.—June 27th. Electricity Department. Two 1,000-kVA and three 50-kVA transformers and 6,600-V switchgear and metering equipment. (June 5th.)

Bristol.—July 14th. Electricity Department. Two steam-raising units. (June 12th.)

Burnley.—June 22nd. Electricity Department. Switchboard, four-switch units, three 400-kVA transformers and h.v. cables. (June 12th.)

Coseley.—June 30th. U.D.C. Electrical wiring of seventy houses on the Princes End site. J. C. Roper, clerk to the Council, Council House.

Dagenham.—June 29th. U.D.C. Electrical installations at the new Town Hall. (See this issue.)

Dartford.—June 29th. Borough Council. Street lighting columns and lanterns, time switches and cases and brackets and lanterns. (June 12th.)

East Grinstead.—June 24th. U.D.C. Switch and ring-main units. (June 12th.)

East Retford.—June 24th. Electricity Department. L.v. switchgear. (June 12th.)

East Riding.—June 22nd. County Council. Replacement of existing heating boilers at the County Hall, Beverley, by (a) low-pressure hot-water boilers for various methods of firing, or (b) electrical thermal storage. County architect, County Hall, Beverley (deposit £2 2s. each).

Egypt.—August 18th. Ministry of the Interior. 400-kW electric generating set with foundations, accessories and spares at the Zagazig power station. (T.Y. 30321.)*

Erith.—June 23rd. U.D.C. Electricity Department. Three 500-kVA three-phase, outdoor type transformers, l.v. distribution panels and h.v. switches for sub-stations; alterations to mains cabling at Walnut Tree Road station; and cable for l.v. main connections at sub-stations. (June 5th.)

Essex.—July 6th. County Council Public Health and Housing Committee. Electrical installations at the Black Notley Sanatorium extensions. (June 12th.)

Gellygaer.—June 26th. U.D.C. H.v. and l.v. cables, steel kiosk, h.v. switchgear, transformer, copper conductors, wood poles and meters. (June 5th.)

Guildford.—June 23rd. Corporation. H.v. and l.v. overhead lines at Wood Street. (June 12th.)

India.—SIMLA.—July 16th. Stores Department. Electrically driven facing and re-turning machine and spares for the G.I.P. Railway. (T. 30313.)*

Kirkcaldy.—June 27th. Town Council. Electrical work at Invertiel housing estate. Borough surveyor.

Lichfield.—July 4th. Electricity Department. One 6-panel e.h.v. draw-out truck cubicle type switchboard and e.h.v. overhead line material. (See this issue.)

Lincoln.—June 26th. Electricity Department. Three 300-kVA and three 200-kVA oil-immersed transformers. (June 12th.)

London.—STOKE NEWINGTON.—July 1st. Borough Council. Rising mains in the Coronation Avenue and Imperial Avenue flats. (June 12th.)

ST. PANCRAS.—July 9th. Electricity Department. P.i., l.c. cables, prepayment meters, meter boards and cooking stoves, fires, wash-boilers and water-heaters for twelve months commencing August 1st next. (June 12th.)

CORPORATION OF TRINITY HOUSE.—July 13th. Alterations to existing buildings, dismantling of existing plant, and the installation of new engines and other machinery for fog signal and electric lighting at St. Ann's Lighthouse, Dale, Haverfordwest. J. M. Nicolle, secretary, Trinity House, Tower Hill, E.C.3.

KENSINGTON.—June 28th. Borough Council. Vehicle-actuated traffic signals at four junctions. Borough engineer, Town Hall, W.8.

SOUTHWARK.—July 1st. Borough Council. Internal communication telephone system for the Municipal Buildings, Walworth Road. (See this issue.)

Manchester.—June 20th. Electricity Committee. Fire extinguishing equipments at the Barton and Stuart Street stations, passenger and goods lift for the Barton station and three 250-kW mercury-arc rectifier equipments. (June 5th.)

July 11th. Assize Courts and Judges' Lodgings Committee. Electric lighting fittings at the Civil and Crown Courts and other rooms at the Courts. D. D. Boliver, steward, Assize Courts.

Middlesex.—July 6th. County Council. Electrical installations comprising distribution cable, lighting, power, clocks, ward and staff signalling systems, and heating and cooking at the Hillingdon County Hospital extensions. (June 5th.)

Moray and Nairn.—June 23rd. Joint County Council. Heating and electric lighting of buildings to be erected in connection with the proposed centralisation scheme at Elgin Academy. C. C. Doig, architect, Elgin.

Newcastle-under-Lyme.—June 24th. R.D.C. Duplicate motor driven borehole and booster pumping plant (22,500 gal. per hour) with electric motors and switchgear, for a new pumping station at Audley. A. H. S. Waters, consulting engineer, 25, Temple Row, Birmingham (deposit £2 2s.).

New Zealand.—WELLINGTON.—July 7th. Public Works Department. Diesel-electric generating set and switchgear. (T.Y. 30281.)* One deep well pump with electric motor-driven power head, automatic starter, &c. (T. 30280.)*

August 11th. Public Works Tender Board. Seven 110-kV oil-immersed circuit-breakers. (T.Y. 30302.)*

NEW PLYMOUTH.—August 27th. Harbour Board. One 2-ton electric level luffing, portal, travelling jib crane and spares. (T. 30279.)*

North Cotswold.—June 20th. R.D.C. Electrically driven vertical spindle sewage pump (6,250 gal. per hour) and a similar storm water pump (16,000 gal. per hour) for the pumping station, Moreton-in-Marsh. Elliott & Brown, engineers, Burton Buildings, Parliament Street, Nottingham (deposit £2 2s.).

Northern Ireland.—BELFAST.—June 23rd. Town Council. Street fire alarm system, comprising 110 call points with associated apparatus. Chief officer, Fire Brigade Headquarters.

Portsmouth.—July 3rd. Electricity Undertaking. Two 100-kW rectifier sets. (June 12th.)

Saltcoats (AYRSHIRE).—June 22nd. Town Council. Electric lighting at seventy-two houses. R. Rennie, 23, Bradshaw Street (deposit £1 1s.).

South Africa.—CAPE TOWN.—July 1st. Electricity Department. 2,000 25-A single-pole, iron-clad service cut-outs. (T.Y. 30271.)* Street lighting fittings and spares, fly fuses, line taps, insulators, &c. (T. 30272.)*

July 15th. One l.v., a.c., iron-clad switchboard. (T.Y. 30310.)*

PRETORIA.—July 17th. Union Tender & Supplies Board. Frequency meters and dial testers. (T. 30336.)*

JOHANNESBURG.—July 30th. City Council. L.v. switchgear. (T.Y. 30340.)*

Southampton.—June 23rd. Electricity Department. Domestic electric cookers. (June 12th.)

June 30th. Transformer kiosk, 6,600-V and 660-V switchgear and 6,600-V reactors. (See this issue.)

Swansea.—July 1st. Borough Council. 150-W horizontal-mounting sodium vapour lamps, lanterns and electrical equipment. (See this issue.)

West Riding.—June 29th. County Council. Electric lighting at Pontefract Girls' High school and electric lighting and heating at Selby School of Art. Education Officer, County Hall, Wakefield.

June 23rd. General Purposes Committee. Electrically driven vacuum pump at the County Hall, Wakefield. West Riding architect, County Hall, Wakefield.

---

* Further particulars from the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, London, S.W.1.

Contracts Closed

Aberdeen.—Housing Committee. Accepted. Electrical work at the Woodside housing estate (£441).—A. Ross.

Bath.—Corporation. Accepted. Supplies for twelve months: Meters.—Met.-Vick. Electl. Co.; Ferranti, Ltd. Meter boards.—Gloucester Woodworking Co. Joint box compound.—Limmer & Trinidad Lake Asphalt Co. House service fuse boxes.—Sykes & Dyson, Ltd. Underground joint boxes.—W. Lucy & Co.; Aero Engines, Ltd. H.v. switchgear for sub-stations.—Met.-Vick. Elecl. Co. Transformers.—British Electric Transformer Co.; Electric Construction Co.

Bilston (STAFFS).—Education Committee. Accepted. Wiring for electric lighting at extensions to the Fraser Street schools. (£393.)—France's Electric, Ltd.

Bourne.—Abbey Church Council. Accepted. Electric lighting in the Church (£121).—J. D. Spire & Co.

Brechin (ANGUS).—Town Council. Accepted. Electric lighting of two tenement blocks, Montrose Street.—J. Davidson.

Chesterfield.—Education Committee. Accepted. Electrical installation at Brampton school (£159).—Brayshaws.

Electricity Committee. Accepted. Transformer kiosk (£317) and a 650-kVA transformer (£333).—Brush Elecl. Engg. Co.

Darlington.—Town Council. Accepted. Erection of overhead electric lighting equipment at Croft.—F. Reid, Ferens & Co. E.h.v. sub-station switchgear.—Ferguson, Pailin, Ltd.; A. Reyrolle & Co.

Douglas (I.O.M.).—Electricity Committee. Accepted. Rectifying plant (£1,345).—Hewittic Electric Co.

Eastbourne.—Corporation. Accepted. Electric kettles.—Bulpitt & Sons.

Glasgow.—Corporation. Accepted. Electrical installation at Whiteinch school.—Johnston Park and Co.

Lighting Committee. Accepted. Electrical work at the electrical control station, Shettleston Road (£295).—Johnston Park & Co.

Transport Committee. Recommended. Rotary convertors, switchgear, &c. (£16,529).—English Electric Co.

Grange.—U.D.C. Accepted. Three 100-kVA transformers (£84 each).—Brush Elecl. Engg. Co.

Hastings.—Electricity Committee. Accepted. Switchgear (£403).—A. Reyrolle & Co. Two 1,500-kVA transformers (£2,004).—Ferranti, Ltd.

London. — CAMBERWELL. — Libraries Committee. Recommended. Electric lighting fittings for Art Gallery. (£273).—G.E.C.

CHELSEA.—Finance Committee. Recommended. Internal telephones at Town Hall (£219).—Automatic Electric Co.

BATTERSEA.—Electricity Committee. Accepted. Transformers at Wandsworth Common kiosk, Grayshott Road sub-station and the Southern Railway Co.'s Granary, Nine Elms (£1,005).—British Electric Transformer Co. E.h.v. switchgear at Grayshott Road sub-station (£150).—Switchgear & Cowans, Ltd. L.v. switchgear at Grayshott Road sub-station (£377).—G.E.C. E.h.v. and l.v. switchgear at the Southern Railway Co.'s Granary, Nine Elms (£670).—J. G. Statter & Co.

Morecambe.—Electricity Committee. Recommended. Switchgear for seven sub-stations (£6,598).—A. Reyrolle & Co. Earthenware conduits.—Hepworth Iron Co. Meter boards.—Edmondson Bros. Insulating tape.—L. Andrew & Co. Cables.—W. T. Glover & Co.

Newark (NOTTS).—Accepted. Kiosk for the supply to Gilstrap Earp & Co. (£311).—G.E.C. 300-kVA transformer for Bowbridge Road (£138).—British Electric Transformer Co. Kiosk on Beacon Hill (£147) and switchgear at the sub-station (£312).—W. Lucy & Co.

Portsmouth.—Electricity Committee. Accepted. Electric sign at North End showrooms (£190).—Sign Construction Co. Kiosks (£686) and switchboard reconstruction (£12,750).—English Electric Co.

Sleaford.—Electricity Committee. Accepted. Cables for the Northlands housing estate (£330).—Callender's. Supplies for twelve months: Cables.—Callender's. Meters.—Aron Electricity Meter; Smith Meters, Ltd.

Southend-on-Sea.—Town Council. Accepted. Fire alarm system at the Hospital and Institution (£755).—Standard Telephones.

Wakefield.—Housing Committee. Accepted. Wiring 150 houses on the Lupset estate.—H. Goodyear.

Wallasey.—Electricity Committee. Accepted. Boiler repairs (£1,570).—Simon-Carves, Ltd.

Walsall.—Electricity Committee. Accepted. Morrison electric vehicle (£256).—E. C. Paskell, Birmingham.

Forthcoming Events

Institution of Electrical Engineers.—Thursday, July 2nd. Natural History Museum, London, S.W.7. Annual conversazione. Wednesday, July 15th. Institution, London, W.C.2. Conversazione and reunion of members from overseas.

South Midland Centre.—Tuesday, June 30th. Summer meeting. Visits to the works of the British Thomson-Houston Co., Rugby, and the Shakespeare Memorial Theatre, Stratford-on-Avon.

Transmission Section.—Friday, July 17th, to Monday, July 20th. Visit to France, including trips to Creney, near Troyes, and to St. Denis.

Chemical Engineering Congress.—Monday, June 22nd, to Saturday, June 27th. Central Hall, London, S.W.1.

Institution of Heating and Ventilating Engineers.—Monday, June 22nd, to Wednesday, June 24th. Cliftonville, Margate. Summer meeting. "Heating Research." Mr. A. F. Dufton.

Association of Mining Electrical Engineers.—Tuesday, June 30th, to Friday, July 3rd. Russell Hotel, London, W.C.1. Annual convention.

Electrical Contractors' Association.—Wednesday, July 8th, to Friday, July 10th. Metropole Hotel, Folkestone. Annnal conference.

Notes

The Civils' Conversazione

The customary exhibition arranged on the occasion of the annual conversazione of the Institution of Civil Engineers last week included the Standard-Sunbury cathode-ray engine indicator shown by Mr. F. Gill, while a model and instrument illustrating a gas-collecting recorder for transformers, &c., were displayed by Mr. W. C. Kennett. A collection of miners' lamps by Prof. K. N. Moss showed the historical development of underground mine lighting, while the National Physical Laboratory lent photographs illustrating the X-ray crystal analysis of materials. Models indicating the British technical requirements for the illumination of aerodromes for night flying were displayed by Mr. C. C. Paterson who, in conjunction with Dr. C. J. Smithells, also exhibited examples of a new G.E.C. heavy alloy developed primarily for screening purposes in connection with radium therapy. Mr. R. W. Mountain demonstrated a photo-electric telemeter, and a cathode-ray recurrent surge analyser was shown by Mr. F. H. Clough, together with B.T.H. low, medium, high and extra-high pressure mercury lamps, while stroboscopic observation by means of special discharge lamps was demonstrated. Models of Reyrolle metal-clad switchgear at the Tongland (Galloway Co.'s) hydro-electric power station and of a typical contrasting outdoor sub-station using open-type gear were lent by Mr. W. H. Clothier. Motor-actuated apparatus for measuring surface irregularities was shown by the Road Research Laboratory (director, Dr. R. E. Stradling). Mr. George Ellison (chief engineer of the Southern Railway) displayed models of the proposed articulated lift bridge (motor driven) and steel sill fitted with dock gates (operated by motors on the Austin constant current system of control) for the Dover train ferry.

Water Power in Brazil

In a lecture before the Institution of Civil Engineers on Tuesday of this week, Mr. Asa Billings gave an account of the Serra development of the Sao Paulo Tramway Light & Power Company, whose output is now over 800 million kWh per annum at a 70 per cent. load factor, the latter being influenced by the use of pumped storage. The water supply has been obtained by reversing the flow of rivers, which formerly drained towards the interior, by means of dams that divert the water into reservoirs. From these it is carried down the steep fall (2,500 ft.) at the edge of the Serra to the hydro-electric plants. Considerable difficulties were encountered in the design and construction of the penstocks owing to the formation of the Serra slope, which consists of loose boulders. The amount of hydro-electric power available is limited only by demand, and the use of electrode boilers is a possibility. It was said that Brazil contains 23 per cent. of the world's iron resources and considerable amounts of other minerals, but is without coal.

The E.A.W. Luncheon

There were about 250 present at the luncheon given by the Electrical Association for Women on June 11th at the Assembly Rooms, George Street. Miss M. G. Cowan, O.B.E., M.A. (president, Edinburgh and District Branch), proposing from the chair the toast of the City of Edinburgh, said that the Association stood for a scientific use of electricity, and had issued diplomas for teachers, saleswomen, and housewives. One of its aims was to have schools so equipped with electrical household appliances as to make children electrically minded. Baillie G. B. Aldridge, responding, stated that the Electricity Department did everything it could to help forward the Association by lending its rooms and staff.

Lady Brooke, M.B.E., proposed the toast of "The I.M.E.A.," as the first electrical body to give public recognition to the E.A.W., which had like aims to its own in disinterested public service. She realised that the I.M.E.A. stood between the devil of borough finance and the deep sea of electrically minded housewives. Mr. E. Seddon (president, I.M.E.A.) expressed the view that through the E.A.W. the industry got the ear of women. In this way electricity would provide relief from the monotonous aspects of everyday work. Votes of thanks to the speakers were proposed by Miss Margot Kidd, M.A., LL.B.

Golf at the I.M.E.A. Convention

The result of the golf competition for the G. P. Dennis Challenge Trophy in aid of the I.E.E. Benevolent Fund held at Bruntsfield Links Golfing Society's course during the I.M.E.A. Convention was as follows:—First (Dennis Trophy and replica), Mr. J. S. Pickles; second, Councillor A. Chambers (golf balls given by Henley's Tyre & Rubber Co.); third, Mr. Ray Berry. The prizewinners gave the proceeds of the sweep to the Benevolent Fund. As a result of the competition a sum of £12 8s. 6d. has been sent to the Secretary of the I.E.E.

Appointments Vacant

Deputy city electrical engineer for Liverpool Electric Supply Department.

Senior technical officer (civilian) and Assistant III (civilian) in the Admiralty Technical Pool.

Assistant mains engineer for the Peterborough Corporation Electricity Department.

Electrical engineering assistants for the Air Ministry (£270 a year).

Installation inspector for the Hornsey Corporation Electricity Department.

(See our classified advertisements.)

Our Service Department

EVERY day inquiries of all kinds are received by the Editors, the bulk of them relating to the producers of specified classes of electrical goods. We are able to reply to most of these with the aid of our extensive records, but in a few cases we have to seek the assistance of our readers. This week we have been asked for the names and addresses of manufacturers of the following:—

GROWLER machines for locating generator armature faults.
HEATMASTER American-made electric toaster (suppliers).
CLIX-ON thermostat control.
NONA automatic curtain control equipment.
W.A.L. coal cutters.
SIGNALON fluorescent red paint.

Readers should enclose stamped addressed envelopes when making their inquiries.

Our Personal Column

Electrical men are invited to keep readers of the "Electrical Review" posted concerning their movements

Mr. C. D. Taite, who contributed an article on "Large Industrial Loads" to our last week's special issue, was, by a printer's error, described as chairman of the "E.R.A." Council. He is, of course, chairman of the Council of E.D.A. The chairman of E.R.A. is **Mr. A. Berkeley,** M.I.E.E.

Mr. D. A. Gould, of Romford, who was recently married to Miss Elsie Honour, was presented by his colleagues on the staff of the County of London Electric Supply Co., Ltd., with an electric chiming clock.

By the Mayor's casting vote, a resolution to increase the salaries of Wolverhampton's eight principal officials was passed at a meeting of the Town Council last week. Mr. **T. A. G. Margary,** the borough electrical engineer, will receive an additional £100 per annum.

The governors of Loughborough College announce that the following have been awarded British Empire Scholarships for 1936, valued at £75 each: J. C. S. Cumming, A. Q. B. Davis, M. J. Hetreed, C. M. Jolliffe, J. F. T. Ogilvie, A. W. G. Cox, R. E. Sewell. Entries were received from such widely scattered parts of the Empire as Rhodesia, India and New Zealand.

Sir Oliver Lodge celebrated his eighty-fifth birthday last Friday.

Mr. W. R. Willis has been recommended by the Liverpool Electric Power and Lighting Committee for the position of district mains superintendent.

Mr. E. G. Vaughton, installation engineer to the Singapore Municipal Electricity Department, is home in this country on leave. He will return to Singapore in October. His brother, Mr. H. T. Vaughton, has recently moved to London.

Mr. E. G. Vaughton

Mr. R. H. West, manager of the Burnley branch of Messrs. W. T. Henley's Telegraph Works Co., Ltd., has been appointed manager of the Manchester branch as from June 1st, with **Mr. H. Smith** as assistant manager. Prior to his appointment in 1931 as manager of the Burnley branch Mr. West was for many years attached to the company's Manchester office. The Burnley premises will remain under the control of Mr. West.

Mr. T. B. Stanaway has been elected president of the West Wales branch of the Association of Mining Electrical Engineers for the 1936-37 session.

Mr. Alfred Clark, chief power engineer to British Celanese, Ltd., Derby, and **Mr. Alfred Hewlett,** managing director, Consall Collieries, Nottingham, have been elected large-consumer representatives on the East Midlands Electricity Advisory Board.

Mr. W. B. Woodhouse, engineer and manager of the Yorkshire Electric Power Co., has been appointed to the board of the Company as managing director.

Mr. Leslie C. Gamage, secretary of the General Electric Co., Ltd., and director in charge of the export business of the company, returned last week from his tour of branch establishments in Australia and New Zealand. Mr. Gamage,

Mr. Leslie C. Gamage and the Hon. Mrs. Gamage "taking a constitutional" on the *Queen Mary*

who was accompanied by his wife, the Hon. Mrs. Gamage, elder daughter of Lord Hirst, left England on January 9th, and returned home, *via* the United States, on the *Queen Mary*.

Obituary

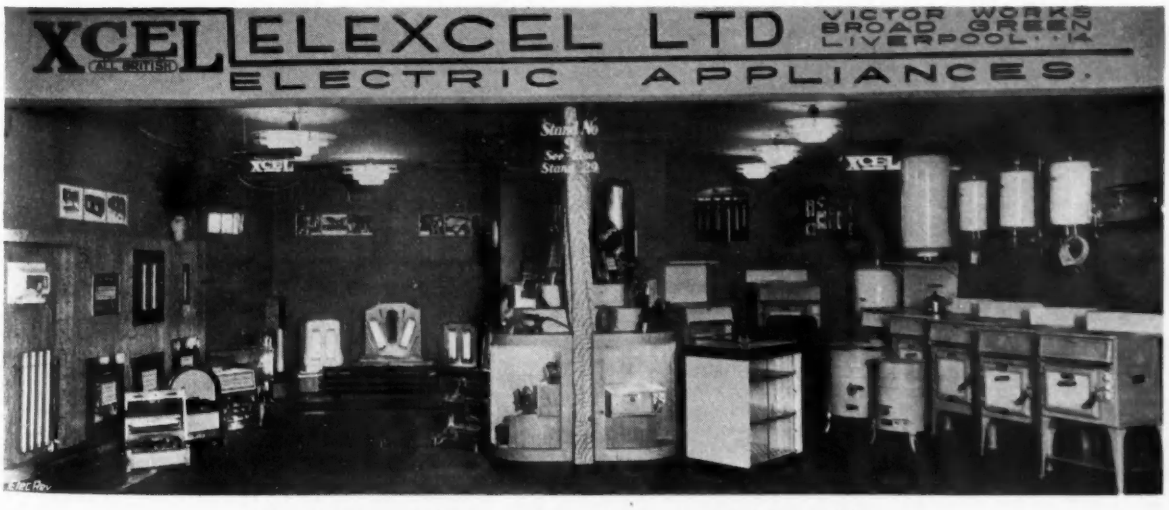
Mr. Max Byng.—We regret to record the death of Mr. Max Byng, which occurred on June 10th, at 25, Palace Gate, London. He will be remembered by some of our readers as one of the early directors of the General Electric Co., Ltd., and a brother of the late Mr. Gustave Byng, whose son, Mr. E. C. Byng, is one of the present directors of the company. Mr. Max Byng, whose interest in the affairs of the company ceased many years ago, became an Associate of the I.E.E. in 1892 and a full member in 1898.

Mr. J. Dundas.—The death recently occurred suddenly of Mr. John Dundas, chairman since 1915 of George Scott & Son (London), Ltd., and Ernest Scott & Co., Ltd. Mr. A. M. Ewing, one of the directors, succeeds him in the chair, and Mr. G. W. Riley, chief of the technical staff of the Scott companies, has been elected to the board.

Mr. A. L. Cave.—We regret to record the death of Mr. A. L. Cave, for many years the manager of the Electrical Department of Messrs. Pearson Bros. (Nottm.), Ltd. He had been in the service of the company for over twenty-eight years.

Mr. N. W. Greenway.—The funeral took place, at Moseley Parish Church, on Monday, of Mr. Noel Wilson Greenway, consulting engineer and a director of Messrs. Gaskell & Chambers, Ltd.

Mr. A. G. Tester, who was in business as an electrical contractor in Queen's Road, Hastings, died on June 6th at the age of fifty-two.



The well-arranged display of Elexcel, Ltd., at the I.M.E.A. Exhibition

Financial Section

New Companies. Official Returns of Capital. Debenture Charges. Reports of Electrical Companies. Dividend Announcements. Transactions in Stocks and Shares

New Companies Registered

Siroma Engineering Co., Ltd.—Private company.—Registered June 8th. Capital, £20,000. Objects: To acquire the business now carried on at 46, Commercial Street, E.1, as "Arthur Morris & Co.," including the registered trade mark, "Siroma," and to carry on the business of electrical and mechanical engineers, manufacturers of and dealers in vacuum cleaners, component parts and accessories, &c. The subscribers are: H. Bullock, 41, Brunswick Road, Ealing, W.5; and A. B. Coleman, 92, Cavendish Avenue, Sudbury Hill, Harrow. Solicitors: Harris Chetham & Cohen, 6, Stratford Place, W.1.

Service Battery Co., Ltd.—Private company. Registered June 10th. Capital, £2,000 in 1,000 5 per cent. preference and 1,000 ordinary shares of £1. Objects: To acquire the business of manufacturers of electrical accessories for motor cars and otherwise heretofore carried on by the Service Battery Co. at 136, West Street, Sheffield. The directors are: A. Noon, Goldwell House, Ashgate Road, Chesterfield; and C. F. Turton, 27, Fir Street, Walkley, Sheffield. Solicitors: Claude Barker Elliott & Co., 7, St. James' Row, Sheffield.

John Stubbs Industries, Ltd.—Private company. Registered June 5th. Capital, £5,000 in £1 shares. Objects: To carry on the business of refrigerator and cold room manufacturers, designers of and wholesale or retail dealers in refrigeration plant of all kinds, wireless transmitting and receiving sets, electrical apparatus, &c. The directors are: J. Stubbs (permanent), 39, Bootham, York; and J. A. P. Boulton, The Avenue, Clifton, York. Registered office: 39, Bootham, York.

Philco Radio and Television Corporation of Great Britain, Ltd.—Private company. Registered June 8th. Nominal capital, £100. Objects: To acquire the business of P.R.T. Corporation, Ltd., and to carry on the business of manufacturers of and dealers in radio products and apparatus, tools, instruments and apparatus in connection with radio and television, &c. The first directors are: H. W. McAtreer and T. E. Williams. Registered office: Wadsworth Road, Perivale, Middlesex.

Radio & Musical Services (Carmarthen), Ltd.—Private company. Registered June 10th. Capital, £500 in £1 shares. Objects: To carry on the business of manufacturers of, agents for and dealers in wireless apparatus, electrical fittings, &c. The directors are: J. Davies, 8, Pentrefelin Street, Carmarthen; and W. D. Jones, 5, Orchard Street, Carmarthen.

Central Electric and Radio Service (Glasgow), Ltd.—Private company. Registered in Edinburgh June 11th. Capital, £1,000. Objects: To carry on the business of electrical engineers, electric power, heat and light installation engineers, &c. The directors are: L. Ruglen, 48, Gorget Avenue, Glasgow, W.3; R. M. Govan, 21, Ness Street, Glasgow, E.1; and E. R. Orr, Lednabra, Balfron Station, Stirlingshire. Registered office: 107, West Regent Street, Glasgow, C.2.

Harwol Specialities Co., Ltd.—Private company. Registered June 11th. Capital, £500. Objects: To carry on the business of wholesale and retail electrical appliances and fittings dealers, ships deck and engine storekeepers, &c. The subscribers are: J. L. Harris, "Brook Hey," Wood Lane, Greasby, Wirral; and C. W. Harris, "Winder," Manor Drive, Upton, Wirral. Secretary: A. G. Readdy, 21, Warwick Road, Upton, Ches. Registered office: 11, Strand Street, Liverpool.

Radio Services (Bristol), Ltd.—Private company. Registered June 11th. Capital, £1,000. Objects: To carry on the business of wholesale and retail dealers in wireless sets, radiograms, &c. The directors are: H. R. Young, 5, Fernbank Road, Redland, Bristol, engineer, and four others. Registered office: 767, Fishponds Road, Fishponds, Bristol.

Contactor Switchgear, Ltd.—Private company. Registered June 11th. Capital, £20,000. Objects: To adopt an agreement with La Télémécanique Electrique Société Anonyme, and to carry on the business of manufacturers of and dealers in electric control gear of all kinds, but principally electric contactor gear, &c. The directors are: F. Heaton, 4, Sandown Terrace, Chester; H. Rayner, Longmoor, Thornhill Road, Streetley, Warwick; and J. Liwski, 38, Rue St. Sulpice, Paris, 6E. Registered office: 21, Bennetts Hill, Birmingham.

J. M. C. Field & Co., Ltd.—Private company. Registered June 11th. Capital, £100. Objects: To carry on the business of designers and manufacturers of, agents for and dealers in electrical fittings and equipment, and all kinds of apparatus relating to wireless telegraphy or telephony, &c. The directors are: J. M. C. Field (permanent managing director) and Mrs. E. M. Field, both of Nutshell, Aberayron, Cardiganshire. Solicitors: Mainwaring, Eric Lloyd & Co., 9, Spilman Street, Carmarthen.

Webb & Taylor, Ltd.—Private company. Registered June 12th. Capital, £1,000. Objects: To carry on the business of importers, exporters, merchants, agents for and wholesale and retail dealers in radio and other sound-producing or musical instruments, &c. The directors are: Sidney W. Webb, 67, Walpole Road, N.17, and two others. Registered office: 649, High Road, Tottenham, N.17.

Evrizone Radio and Television Co., Ltd.—Private company. Registered June 11th. Capital, £1,100. Objects: To acquire the business of a manufacturer, distributor and exporter of wireless sets and electrical appliances, &c., carried on by J. G. S. Nott at 69, Albert Road, Bromley, Kent, as "Sydney Nott." The directors are: J. G. S. Nott, 7, Highland Road, Bromley, Kent; and W. A. E. von Koettlitz, 52, Warrington Road, Harrow, Mdx. Solicitors: Roper & Forvargue, 4-5, Station Parade, Eastbourne.

Hanson Electrical Co., Ltd.—Private company. Registered June 12th. Capital, £200. Objects: To manufacture wireless or other sound-reproducing appliances, &c. The directors are: E. F. W. Hanson, 4, Warden Avenue, Rayners Lane, Harrow, Mdx.; and A. L. Darling, 17, Warden Avenue. Registered office: Field End Parade, Field End Road, Eastcote, Mdx.

Osborn Manufacturing Co., Ltd.—Private company. Registered June 9th. Capital, £4,000. Objects: To carry on the business of manufacturers of and dealers in electrical fittings and cellulose sprayed domestic hardware specialities, &c. The directors are: E. H. Douglas-Osborn, The Leasowes, Cherry Hill, Barnt Green, Birmingham; and two others. Registered office: 1/7, Masshouse Lane, Birmingham, 5.

Sound Services, Ltd.—Private company. Registered June 13th. Capital, £500. Objects: To carry on the business of consulting wireless experts, designers, manufacturers, fitters and suppliers, &c. The subscribers are: C. P. Lister, 19, Etherington Drive, Hull, incorporated accountant; and J. L. Anderson, "Lesmyr," Boothferry Road, Hessle, clerk. Solicitor: P. S. Briggs, Royal Insurance Buildings, Bowlalley Lane, Hull.

Blooms Radio, Ltd.—Private company. Registered June 13th. Capital, £1,000. Objects: To carry on business as dealers in wireless goods and accessories of all kinds, electrical goods and fittings, &c. The subscribers are: D. N. Cunitz, 18, Richmond Road, Cardiff, incorporated accountant; and G. J. Evans, 69, Maindy Road, Cardiff, clerk. Secretary: Lilian A. Harwood. Registered office: 35, Caroline Street, Bridgend.

Returns of Electrical Companies

A. E. Morrison & Sons, Ltd.—Satisfaction in full on April 9th, 1936, of two charges dated April 13th, 1933, and registered May 2nd, 1933. (According to the register of mortgages the only deeds registered May 2nd, 1933, were two mortgages which originally secured all moneys due to bank.)

Bowers & Barr, Ltd.—Mortgage dated June 2nd, 1936, to secure £450 charged on 9, Baker Street, Gorleston, Gt. Yarmouth. Holders: Trustees of Court "Star of the East" No. 2728 Branch of the Great Yarmouth and East Norfolk District of the Ancient Order of Foresters Friendly Society. Satisfaction in full on May 29th, 1936, of mortgage dated January 21st, 1930, and registered February 5th, 1930. (According to the register of mortgages the mortgage registered February 5th, 1930, originally secured £350.)

Electrical Commodities, Ltd.—Mortgage debenture charged on the company's undertaking and property, present and future, including uncalled capital, dated May 30th, 1936, to secure all moneys due or to become due from the company to Barclay's Bank, Ltd.

The nominal capital has been increased by the addition of £8,000 in £1 ordinary shares beyond the registered capital of £2,000.

C. C. Pudney & Co., Ltd.—Debenture charged on the company's interest in lease of 11, Guildhall Street, Bury St. Edmunds, and the company's undertaking and other property, present and future, including uncalled capital, dated May 14th, 1936, to secure all moneys due or to become due from the company to Lloyds Bank, Ltd.

H. A. Stonham & Co., Ltd.—Particulars filed of debentures not exceeding £1,200, authorised May 11th, 1936, charged on the company's undertaking and property, present and future, including uncalled capital, the amount of the present issue being £1,200.

Kingsway Electricals, Ltd.—Particulars filed of debentures not exceeding £3,000, authorised May 25th, 1936, charged on the company's undertaking and property, present and future, including uncalled capital, the amount of the present issue being £2,500.

T. H. Satchwell, Ltd.—Particulars filed of £2,000 debentures authorised May 18th, 1936, charged on the company's undertaking and property, present and future, including uncalled capital, the amount of the present issue being £1,450.

Tadcaster Electricity Co., Ltd.—The nominal capital has been increased by the addition of £9,000 beyond the registered capital of £12,000. The additional capital is divided into 1,800 ordinary shares of £5.

Weald Electricity Supply Co., Ltd.—The nominal capital has been increased by the addition of £400,000 in £1 ordinary shares beyond the registered capital of £600,000. At March 26th, 1935, the County of London Electric Supply Co., Ltd., held nearly all the shares.

South West Electricity, Ltd.—The nominal capital has been increased by the addition of £6,000 beyond the registered capital of £4,000. The additional capital is divided into 24,000 ordinary shares of 5s. each.

Telephone Manufacturing Co., Ltd.—The nominal capital has been increased by the addition of £150,000 beyond the registered capital of £250,000. The additional capital is divided into 600,000 ordinary shares of 5s. each.

Pilot Radio, Ltd.—The nominal capital has been increased by the addition of £15,000 beyond the registered capital of £100. The additional capital is divided into 15,000 6 per cent. cumulative redeemable preference shares of £1 each.

Bede Electric Co., Ltd.—The nominal capital has been increased by the addition of £600 in £1 shares beyond the registered capital of £500.

Ryland's Electrical Co., Ltd.—Capital, £1,000 in £1 shares. Return dated February 12th, 1935 (filed April 28th, 1936). All shares taken up. £1,000 paid. Mortgages and charges, nil.

Power Contracts (Batwin), Ltd.—Capital £10,000 in 1,000 preference and 9,000 ordinary shares of £1. Return dated July 16th, 1935 (filed May 2nd, 1936.) 1,000 preference and 5,202 ordinary shares taken up. £602 paid. £5,600 considered as paid. Mortgages and charges, £2,000.

A. H. Whitehead & Co., Ltd.—Capital, £300 in £1 shares. Return dated May 13th, 1935 (filed April 25th, 1936). All shares taken up. £300 considered as paid. Mortgages and charges, £300.

R. King & Sons, Ltd.—Capital, £5,000 in £1 shares. Return dated December 31st, 1935 (filed March 9th, 1936). All shares taken up. £1,200 paid. £3,800 considered as paid. Mortgages and charges, nil.

Lesco Trading Co., Ltd.—Satisfaction in full on May 28th, 1936, of debenture dated February 1st, 1933, and registered February 8th, 1933, securing £300.

Particulars filed of £10,000 debentures authorised May 29th, 1936, charged on the company's undertaking and property, present and future, including uncalled capital, the amount of the present issue being £2,000.

A. Vandam & Co. (1933), Ltd.—F. W. Paterson, 35, Great Tower Street, E.C.3, was appointed receiver on June 3rd under powers contained in debenture dated December 30th, 1935.

Direct Electric Lamp Co., Ltd.—Capital, £1,000 in £1 shares. Return dated December 31st, 1935 (filed March 20th, 1936). Four shares taken up. £4 paid. Mortgages and charges, £1,000.

City Notes

The General Electric Co., Ltd., has issued its report for the year ended March 31st last. The profit for the period amounted to £1,485,153, as compared with £1,184,483 in 1934-35—an increase of over £300,000. A balance of £467,018 brought forward is added, making £1,952,171. The allocations from this total £335,140, including the payment of preference dividends, depreciation, directors' remuneration, pension fund and transfers to taxation reserve (£194,245) and reserve account (£100,000, against £98,883). From the available balance of £1,117,031 it is proposed to pay a dividend of 10 per cent. on the ordinary shares, as before, with the addition of a 5 per cent. bonus, leaving £680,495 to be carried forward. The directors report increased activity in almost every department, largely due to the progress and recovery in the steel, coal-mining, shipbuilding and other industries. The heavy engineering works have operated at full capacity during the year. Communication planning in this and other countries has largely assisted the telephone and cable work, while the continuation of the building programme and the more general application of electricity in the home have created a larger demand for the company's domestic appliances. Although the manufacturing organisation was considerably extended during the year, further additions are in progress at the works, the head office and branches. The company's export business shows a further advance. Among the overseas branches, India, Australia, South Africa and Argentina report satisfactory results; the Malay States show an improvement over the previous year; but China and France are still trading under extremely difficult conditions. Other countries, particularly Palestine, are developing an increasing market for electrical products. A decrease of about £450,000 in liquid resources is accounted for by the increase in "debtors" and "stock," which is an indication of the growth of the company's business. The order books for the ensuing year are very satisfactory, and altogether, state the directors, the outlook for the near future is encouraging. To provide the necessary capital for general development the directors propose to issue 381,670 ordinary shares of £1 at the price of £3 each, in the first place to present shareholders in the proportion of one new share for every ten shares already held. The company now employs over 34,000 people—an increase of about 4,000 during the year. Accompanying the report was an interesting booklet containing pictures of the company's research laboratories and examples of its wide range of manufactures. The meeting is to be held on June 25th.

Electrical Switchgear & Associated Manufacturers, Ltd.—Particulars of this company were published on June 12th for information only. The company was incorporated last month (ELEC. REV., May 22nd, page 763) with an authorised capital of £225,000 in 100,000 5 per cent. cumulative preference shares of £1 each and 250,000 ordinary shares of 10s. each. Its objects are *inter alia*:—(a) To act as a holding company of companies carrying on the business of manufacturing and dealing in switch-gear and other electrical plant, machinery and apparatus, and to act as a central organisation and co-ordinating body for the encouragement and advancement of co-operation, development and research between companies financially associated through the company. (b) To acquire not less than 90 per cent. of the issued share capital of Brookhirst Switchgear, Ltd., Chester. The purchase price of £200,000 is to be satisfied by the allotment of 75,000 5 per cent. cumulative preference shares of £1 each and 250,000 ordinary 10s. shares.

The Para Electric Railways & Lighting Co., Ltd., had a gross income of £109,522 (against £122.734) for the year ended November 30th last. Operating expenditure increased from £80,020 to £82,141, and after providing for debenture interest £33,878 (£32,962), debenture sinking fund £11,013 (£10,692), income tax and other charges, there was a net debit balance of £23,972, as compared with £9,292. At the present time the company is faced with a programme of capital and renewals expenditure amounting to approximately £160,000 to be expended during the next five years. In these circumstances the only alternative to a further moratorium is the provision of fresh capital, accompanied by a rearrangement of existing debenture charges. Negotiations on these lines have been proceeding for some time, and the directors hope to be in a position to make an announcement in the near future.

Hick, Hargreaves & Co., Ltd., report a trading profit for the year ended March 31st last of £37,118, and after providing for depreciation, debenture interest, &c., a net profit of £25,033, which with £13 brought in makes £25,046 available. It is proposed to place £9,000 to general reserve, £3,000 to special depreciation account, and to pay a dividend of 5 per cent., less tax, leaving £1,046 to be carried forward, subject to directors' fees. The report states that the trading results for the year show a further and substantial improvement. The turnover has been increased by more than 50 per cent., and a satisfactory increase in profit on trading has been earned. The value of the contracts secured and of the uncompleted work on the books is approximately the same as last year. Important additions have been made to the equipment of the works. Meeting: June 23rd.

Mirrlees, Bickerton & Day report a loss on trading for the year ended March 31st last of £8,867 and a net profit of £23,995 on the sale of Government investments, leaving a credit balance of £15,128, which with £520 brought in makes £15,648. The preference dividend for the half-year absorbed £1,513, leaving £14,135. It is proposed that the £23,995 profit on the sale of investments shall be transferred to No. 2 reserve, and that £22,000 shall be withdrawn from existing reserve, thus increasing reserves by £1,995. The final preference dividend takes £1,489, and an ordinary dividend of 2½ per cent. is paid, leaving £1,768 to be carried forward. For the previous year the net loss was £3,949 and no ordinary dividend was paid. Meeting: June 23rd.

The Barcelona Traction, Light & Power Co. held its annual meeting in Toronto on June 9th, when Mr. Miller Lash, vice-president, who presided, reviewed the general conditions of the business of the operating companies in Spain. He indicated that the increase in business was slowing down and, although so far the company was not directly affected, numerous strikes were occurring in different trades which reduced earnings. The labour situation in general was unsatisfactory and the political outlook decidedly uncertain, also there had been considerable social disturbance in other parts of Spain, but not in Catalonia.

The Electric Construction Co., Ltd., reports a surplus for the year ended March 31st last, after providing for debenture interest and depreciation, of £35,114, as compared with £18,337 for 1934-35. It is proposed to pay an ordinary dividend of 7 per cent. for the year (against 3½ per cent.) and to carry forward £16,181. The report states that the increased demand for the company's products announced last year has been fully maintained. During the year under review every department of the works has been fully employed. Work in progress is again considerably greater. Meeting: June 23rd.

The Revo Electric Co., Ltd., reports a profit of £84,690 for the year ended March 31st last. From this is deducted income tax and directors' fees (£22,969), leaving £61,721. A final dividend of 12½ per cent. is recommended, making 17½ per cent. for the year, and £19,794 is carried forward. The report states that the year has been one of keen competition, and although the price of raw materials has risen the company's profit has been maintained by the increase in turnover. Orders on hand are satisfactory.

The Mexican Light & Power Co., Ltd., reports gross earnings of $7,809,824 for 1935, as against $7,855,779 for the previous year. Operating expenditure rose from $5,252,836 to $5,311,141, but bond interest and sinking fund was lower at $2,712,432 ($2,969,800). A deficit of $525,010 compares with $646,430 in 1934.

The Mexico Tramways Co.'s operations last year were considerably affected by a strike, gross earnings declining from $2,494,689 to $2,270,097. Ordinary expenditure, however, was reduced from $3,051,905 to $2,771,467. The net deficit was $722,774, as against $557,216 in 1934.

Ransomes, Sims & Jefferies, Ltd., report an increase in net profits from £24,495 to £55,677 for the year ended March 31st last. It is proposed to pay 2½ years' dividend on the preference shares and, in addition, 2½ per cent. on the ordinary capital. This will leave £36,643 to be carried forward (against £20,966 brought in).

The John Thompson Engineering Co., Ltd., is offering to-day 400,000 five per cent. cumulative preference shares of £1 each at 21s. 6d. per share. The company has been formed to acquire as a going concern the business of John Thompson (Wolverhampton), Ltd., and nearly the whole of the issued share capital of the associated companies.

R. A. Lister & Co., Ltd., is to commence the payment of interim dividends, one of 5 per cent. being announced. For the whole of last year 10 per cent. was paid.

International Combustion, Ltd., announces an interim dividend of 7½ per cent. on its ordinary shares, payable on July 15th.

The London Electric Wire Co. & Smiths, Ltd., has announced an interim dividend of 2 per cent. (against 1¼ per cent.).

The Victoria Falls & Transvaal Power Co., Ltd., has declared a final ordinary dividend of 8 per cent., making 12 per cent. for the year. The total payment for 1934, including a cash bonus of 5 per cent., was 20 per cent., and in addition there was a capital bonus of 150 per cent.

Callender's Cable & Construction Co., Ltd., has declared a final dividend of 10 per cent. on the ordinary shares, making 15 per cent., less tax, for the year (same).

Stocks and Shares

TUESDAY EVENING.

VERY few business days pass without bringing their contribution of increased profits, and in many cases advanced dividends, on stocks and shares in companies connected more particularly with Home industries. This daily accumulation of evidence of expansion in trade justifies the confidence with which the public investor has bought industrial shares for some time past. Moreover, the canons of sound finance are, in the majority of instances, closely observed, the result of which will be seen in future reports, and in equalisation of dividend announcements. The General Electric figures which appeared on the Tuesday in this week can only be regarded as excellent. Optimism had overshot the mark by looking for a higher bonus than the actual issue of new shares affords. On the slight disappointment that this occasioned, the price gave way from the top. The new shares are being dealt in on the basis of 18s. premium.

Quotations of other stocks and shares show noticeable firmness. New issues meet with a welcome that reflects continued willingness on the part of the investor to take shares that offer reasonable security combined with a fair return on the money.

Electricity Supply Shares

There are still no signs of a return of animation to the electricity supply market, as far, at least, as the Home group of companies is concerned. The Electricity Commissioners' report for May, showing the by-now-accustomed improvement

in electricity consumption in comparison with last year's figures, received little heed. Price movements of importance among the Home supply companies' shares are limited to a rise of 1s. in Electrical Distribution of Yorkshires and a fall of 1/16 in Electrical Finance and Securities. The start of dealings in Southern Areas new shares, offered last week at a price of 21s., brought fresh interest to the market. With investors anxious to acquire lines of shares at around the issue price, the opening premium of 6d. quickly expanded to 2s. Edmundson's 43s., Yorkshires 45s. 6d., and Lancashires 38s. 6d. are all on the easy side.

Among shares of companies operating abroad, Palestine "A" declined together with hopes of a quick and satisfactory end to the country's troubles. The price is 1s. 6d. down, at 45s. 6d., and again near the lowest level reached during the past disturbed month. Jerusalem Electrics are also weak at 35s. Holders of Tokyo Electric 6 per cent. bonds have lately had cause for uneasiness on the tentative plans proposed by the Japanese Government for nationalisation of the country's electric power industry; the price of the bonds has rallied to 81½ ex dividend, on the belief that the scheme will be found to be, for the present at least, impracticable. Calcuttas shaded off to 56s. 6d. Peraks, on the other hand, rose 9d. to 25s. 9d. Whitehall Electric preference, still depressed by the tone of the annual meeting, declined 6d. further to 21s. 6d. Victoria Falls moved up slightly to 78s., on the dividend declaration, and East Africans to 30s. 6d.

Manufacturing and Equipment

With active dealings taking place in Crompton Parkinsons, G.E.C.'s and Callenders, the electrical equipment market has a brighter appearance as a whole. Business is, however, of a decidedly selective order, and price movements are neither numerous nor generally of great importance. Hopes—subsequently destroyed—of a higher dividend from Callender's Cable Company strengthened the price of the shares, but repetition of the usual 15 per cent. distribution brought the quotation back to 4¼. Cromptons held last week's big rise to the full extent. Associated Electrical Industries returned to favour with a rise of 1s. 6d. to 47s. 6d. Siemens put on 1/16 again to 28s. 9d. in response to a steady demand. Ever Ready units hardened to 26s. 3d. Chloride Electrical Storage "A" and "B" are lower at 4 7/16 and 4⅜ respectively. Reyrolles are heavy at 73s. 9d., Telegraph Condensers lost 1/16 to 1⅞, and London Electric Wires a few pence to 30s. 6d. In the telephone group International Automatic ordinary receded to 46s., and the "B" deferred to 45s. 3d. Telephone Manufacturing are quoted 9s. 9d., ex rights.

Telegraphs and Telephones

Support for Cable and Wireless stocks is again forthcoming. Prices have given no sign of relapse to the levels reached in the depression that followed the annual meeting. The market is resigned to the temporary abandonment of its hopes of capital adjustment and of a dividend-arrears scheme. The preference is up by 1½ points to 103, and the "B" stock by ¼ to 7. The "A" stock, on the other hand, reacted slightly to 22. Globe Telegraph issues are still heavy, the ordinary being ¼ down at 14⅜, and the Preference ⅛ at 14½. Marconi-Marine shed 6d. to 32s. Great Northerns improved to 44½.

With transatlantic markets in better form, several communication stocks stand well above last week's levels. Western Unions jumped from 80 to 83, and Radio Corporations from 11 1/16 to 12¼. American Telegraph and Telephone stand about 2 points higher at 167½ ex dividend; Internationals, after being 14, are unchanged at 13½.

Miscellaneous Matters

British Electric Traction deferred spurted 50 points to 1,600 after the annual meeting. The value of the bonus has since been deducted, leaving the price 1,450. London Transport "C" stock remains dull at 102, little encouragement being forthcoming from the Board's weekly revenue figures. Brazilian Tractions, at 12⅜, have lost ⅜, going back to 12⅜ after the recent rise.

Electric and Musical Industries recovered to 25s. 3d., the better tone of American markets being partly responsible. E. K. Coles are equally good at 28s. 6d., with the final dividend announcement near. Pye Radio deferred are 12s. 6d., ex rights to the share bonus. Electrolux lost 3/16 to 10 7/16. Lucas spurted 3s. to 65s., and S. Smith preferred, on the bonus share offer, ⅛ to 77s. 6d. Broadcast Relays declined 6d. to 7s. 6d. British Aluminiums at 39s. are 1s. lower as a result of a strike.

Among newcomers, Switchgear and Cowans rose to 14s. 9d. on talk of good current trading, but Franco Signs are easier at 17s. 6d. A public issue is expected to be made shortly by the Philco Radio Company, and a number of other newcomers are being prepared for presentation to the investor's notice.

Atkin's Manual

Atkin's Manual, 1936, makes its appearance this week, and to few other books can the overworked adjective "indispensable" be so appropriately applied. The present work runs to 479 pages, within which the wealth of information is as considerable as it is clearly set out. The great majority of companies dealt with are those connected with electricity in one shape or another, and to people whose work brings them into contact with companies concerned with the electric industry the book is an invaluable vade mecum.

Share List of Electrical Companies

HOME ELECTRICITY COMPANIES.

	Nom.	Dividend. Previous.	Last.	Price. June 16.	Rise or Fall.	Yield p.c. £ s. d.
Bournemouth and Poole	1	15	15	77/6	—	3 17 5
City of London	1	7½	7½	37/–	—	4 1 1
Clyde Valley	1	7	8	45/–	—	3 11 1
County of London	1	10½	10½	56/–	—	3 15 0
Edmundson's 7% Pref.	1	7	7	36/–	—	3 17 9
Do. Ord.	1	8	8	43/–	—6d.	3 14 5
Elec. Dis. Yorkshire	1	9	9	48/6	+1/–	3 14 3
Elec. Fin. and Securities	1	12½	12½	3⅜	—⅛	3 14 1
Elec. Supply Corporation	1	11	11	62/–	—	3 11 0
Lancs Light and Power	1	7½	7½	38/6	—6d.	3 18 0
Lond. Assoc. Electric	1	—	7	35/–	—	4 0 0
London Electric	1	7	8	40/–	—	4 0 0
London Power Deb. Red.	Stock	5	5	108½	—	4 12 2
Metropolitan	1	10	10	51/6	—	3 17 7
Midland Counties	1	7	7½	41/–	—	3 13 2
Mid. Elec. Power	1	8	8	43/9	—	3 13 2
North Eastern Electric Ordinary	1	6	6	34/–	—	3 10 7
Do. 7% Pref.	1	7	7	35/–	—	4 0 0
Northampton	1	10	10	53/9	—	3 14 5
Notting Hill 6% Pref.	10	6	6	14½xd.	—	4 2 9
North Met. Elec. Ordinary	1	10	10	58/9	—	3 8 0
Do. do. 6% Pref.	1	6	6	32/–	—	3 15 0
Scottish Power	1	8	8	43/–	—	3 14 5
South London	1	7	7	34/6	—	4 1 2
Whitehall Elec. Invst. 7½% Pref.	1	7½	7½	21/6	—6d.	6 19 6
Yorkshire Elec.	1	8	8	45/6	—6d.	3 10 4

PUBLIC BOARDS.

Central Electricity, 1950–70	Stock	5	5	118	—	4 4 9
Do. 1955–75	,,	5	5	120	—	4 3 4
Do. 1951–73	,,	4½	4½	110	—	4 1 10
Do. 1963–93	,,	—	3½	101	—	3 9 4
London Elec. Trans. Gtd.	,,	—	2½	96½	—	2 11 10
London & Home Counties, 1955–75	,,	4½	4½	113	—	3 19 8
London Passenger Transport, A	,,	—	4½	123½xd.	—	3 13 0
Do. do. B	,,	—	5	127xd.	—	3 18 9
Do. do. C	,,	3½	4	102	—	3 16 5
West Midlands Joint Elec. 1948–68	,,	—	5	116½	—	4 5 10

TELEGRAPH AND TELEPHONE.

American Tel. & Tel.	$100	9	9	167½xd.	+2	5 7 6
Anglo-Am. Tel. Pref.	Stock	6	6	126½	—	4 14 10
Do. Def.	,,	1½	1½	30	—	5 0 0
Cable & Wireless 5½% Pref.	,,	4½	5½	103	+1½	5 6 10
Do. A. 7½% Ord.	,,	Nil	Nil	22	—½	—
Do. B. Ord.	,,	Nil	Nil	7	+¼	—
Globe Tel. & Tel. Ord.	10	3½*	4½*	14¼xd.	—¼	3 2 7
Do. do. Pref.	10	6	6	14½xd.	—½	4 5 0
Great Northern Tel.	10	20	20	44½	+½	4 10 0
Marconi-Marine	1	10	7½	32/–	—6d.	4 13 9
Oriental Telephone Ord.	1	12*	12*	3½	—	3 13 10

HOME AND FOREIGN TRAMS, ETC.

Anglo-Arg. Trams First Pref.	5	Nil	Nil	1/–	—	—
Do. do. 2nd Pref.	5	Nil	Nil	9d.	—	—
Do. do. 5% Deb.	Stock	Nil	Nil	5	—	—
British Electric Traction Df. Ord.	,,	5	5	1450	—100	—
Do. do. Pref. Ord.	,,	8	8	177½	—	4 10 2
Brazil Traction	100	—	30 cts.	12⅜	—⅜	—
Brit. Columbia Elec. Rly. Pce.	Stock	5	5	102½	—	4 17 7
Mexican Light Common	100	Nil	Nil	3½	—	—
Do. 1st Bonds	$500	5	5	50	—	—
Victoria Falls Ord.	1	20	20	78/–	+6d.	—
West Riding	1	5	6½	51/3	—⅛	2 10 9

MANUFACTURING COMPANIES.

Aron Electricity Ord.	1	10	15	63/9	—	4 14 4
Assoc. Elec. Ord.	1	6	8	47/6	+1/6	3 7 5
Do. Pref.	1	8	8	38/6xd.	—	4 3 1
Babcock & Wilcox	1	8	8	46/6	—	3 8 10
British Aluminium Ord.	1	7½	7½	39/–	—1/–	3 17 0
British Insulated Ord.	1	15	20	5½	—	3 16 2
Brush Ord.	Stock	Nil	Nil	42½	—	—
Callender's	1	15	15	4½	—	3 10 7
Do. 6½% Pref.	1	6½	6½	32/6	—	4 0 0
Crompton Parkinson Ord.	5/–	—	12½	72/6xd.	—	0 17 3
Do. 8% Pref.	1	8	8	2xd.	—	4 0 0
Edison Swan 1st Pref.	1	7½	7½	30/–	—	5 0 0
Electric Construction	1	3½	7	1½xd.	—	4 0 0
Enfield Cable Ord.	1	25	25	5½	—	4 15 3
English Electric	1	Nil	Nil	21/–	—	—
Do. do. Pref.	1	Nil	Nil	25/3	—	—
Ericsson Tel.	5/–	24	20*	2½	—	2 4 6
Ever Ready	5/–	35	35	26/3	+9d.	6 13 4
Ferranti Pref.	1	7	7	28/9	+1/9	4 17 5
G.E.C. Pref.	1	6½	6½	32/–	—	4 1 3
Do. Ord.	1	10	15	4	—4/–	3 15 0
Henleys	1	30	30	7	—	4 5 9
Do. 4½% Pref.	5	4½	4½	5¼	—	3 18 3
India-Rubber Preferred	1	—	5½	1½	—	4 17 9
Johnson & Phillips	1	7½	10	46/3	—	4 6 6
Lancashire Dynamo	1	5	10	2⅛	—	4 6 6
Siemens Ord.	1	4	6	28/9	+⅛	4 3 6
Telegraph Construction	£1	Nil	Nil	26/3	—	—

* Dividends are paid free of Income Tax.

Published Specifications

Compiled expressly for this journal by a firm of chartered patent agents. The numbers in parentheses are those under which the specifications will be printed and abridged and all subsequent proceedings will be taken.

1934

23448. "Electric-discharge devices." British Thomson-Houston Co., Ltd. August 16th, 1933. (447536.)

26927. "Solenoid-actuated valves for controlling the flow of liquids or gases." J. L. Musgrave, D. G. Lewis, and R. Crittall & Co., Ltd. September 19th, 1934. (447468.)

29093. "Detector arrangement for television reception." Radio Akt.-Ges. D. S. Loewe. October 11th, 1933. (Addition to 435417 and 441285.) (447401.)

29145. "Electric motor control systems." British Thomson-Houston Co., Ltd. October 11th, 1933. (447402.)

29596. "Television and like systems." Electric and Musical Industries, Ltd., and M. Bowman-Manifold. October 16th, 1934. (Addition to 392383.) (447403.)

30050. "Frequency-changing circuit arrangements and modulated carrier-wave circuit arrangements." Marconi's Wireless Telegraph Co., Ltd., and O. E. Keall. (October 19th, 1934. (447474.)

30965. "Electric signalling systems." N. Rimmer and A. Robinson & Co., Ltd. September 25th, 1935. (447475.)

32538. "Arrangements for use in electro-chemical processes." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. November 25th, 1933. (447476.)

32585. "Electron-discharge devices." Marconi's Wireless Telegraph Co., Ltd. November 11th, 1933. (447477.)

33112. "Apparatus for use in the electric deposition of metal." W. Y. Newland and G. E. Duke. November 17th, 1934. (447418.)

33142. "Starting systems for alternating-current motors." British Thomson-Houston Co., Ltd. November 18th, 1933. (447480.)

33206. "Electric storage batteries." Pritchett & Gold & E.P.S. Co., Ltd., and E. S. Chapman. November 19th, 1934. (447482.)

33294. "Modulating means for cathode-ray tubes." F. H. Nicoll and Electric & Musical Industries, Ltd. November 19th, 1934. (447493.)

33619. "Gaseous electric-discharge devices." British Thomson-Houston Co., Ltd. November 22nd, 1933. (447617.)

33636. "Electric control arrangements for use in electric lifts and like installations." J. & E. Hall, Ltd., and A. A. Read. November 22nd, 1934. (447549.)

33655. "Electric circuit-breakers of the push-operated type." A. Sadler. (Schiele & Bruchsaler Industriewerke Akt.-Ges.) November 23rd, 1934 (447688.)

33901. "Electrically heated steering-wheel for motor vehicles and aircraft." J. H. Sargent. November 26th, 1934. (447619.)

34009. "Electrical resistances and resistance materials." Marconi's Wireless Telegraph Co., Ltd. November 25th, 1933. (447497.)

34059. "Galleries or shade-holders of lighting fittings." Benjamin Electric, Ltd., and G. Herbert. November 27th, 1934. (447691.)

34170. "Electrical fluid-level indicators." V. J. S. Russell. November 28th, 1934. (447499.)

35212. "Electric supply meters." British Thomson-Houston Co., Ltd. December 7th, 1933. (Addition to 437761.) (447504.)

35291. "Gas-blast electric switches." S. Ruppel. December 8th, 1933. (447694.)

35343. "Electric lamps." Siemens Electric Lamps & Supplies, Ltd., W. H. Le Marechal, and J. N. Aldington. December 8th, 1934 (447428.)

35792. "Rectifiers." Akt.-Ges. Brown Boveri & Cie. December 30th, 1933. (447506.)

35961. "Actuation of electric switches." General Electric Co., Ltd., and R. W. Norton. December 14th, 1934. (447431.)

37340. "Instruments for indicating the direction of an electric or magnetic field or radio emanation." A. B. Gibbons. December 31st,, 1934. (447512.)

37358. "Manufacture of thermionic valves." M-O Valve Co., Ltd., and C. J. Smithells. December 31st, 1934. (447513.)

1935

127. "Thermionic amplifiers for use with electric gramophones and the like." A. G. Burgess and L. E. Ryall. January 2nd, 1935. (447622.)

2634. "Electric capacitors." British Thomson-Houston Co., Ltd. January 27th, 1934. (447625.)

2870. "Small electric motors." Siemens Bros. & Co., Ltd., and H. E. Humphries. January 29th, 1935. (447552.)

3973. "Microphones." Siemens Bros. & Co., Ltd., G. W. Sutton and W. E. Goodwin. February 7th, 1935. (447698.)

4166. "Electrical resistors." General Electric Co., Ltd. (Patent-Treuhand-Ges. für Elektrische Glühlampen.) February 8th, 1935. (447557.)

4185. "Moving-coil relays." J. Carton. February 8th, 1935. (447516.)

4521. "Magneto-electric generators for use more particularly on bicycles." Elektrotechnische Fabrik Schmidt & Co., Ges. June 20th, 1934. (447435.)

5223. "Adjusting devices for wireless apparatus." Ideal Werke Akt.-Ges. für Drahtlose Telephonie. February 17th, 1934. (Cognate application 5224/35.) (447559.)

5456. "Electrical musical instruments." J. Compton Organ Co., Ltd., and L. E. A. Bourn. February 20th, 1935. (447627.)

5800. "Electrical power systems and control equipments therefor." F. A. Eastwood and Associated Electrical Industries, Ltd. February 22nd, 1935. (447436.)

5888. "Electric or gas apparatus for either heating or air-circulating purposes." H. H. Berry. February 23rd, 1935. (447437.)

7233. "Electric hot-plates." Revo Electric Co., Ltd., and F. H. Reeves. March 8th, 1935. (447565.)

7840. "Electron-discharge tubes." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. May 22nd, 1934. (447440.)

8605. "Thermostatically controlled, electrically heated irons." N. F. T. Saunders and N. Barnes. March 19th, 1935. (447442.)

8706. "Pantograph type electric-current collectors." English Electric Co., Ltd., and P. L. Mardis. March 20th, 1935. (447632.)

11864. "Method of and system for determining positions by means of a rotating radio beacon." C. Lorenz Akt.-Ges. April 19th, 1934. (Cognate applications 11865/35, 11866/35 and 11867/35.) (447707.)

13291. "Variable electric condensers." A. H. Stevens (Radio Condenser Co.). May 3rd, 1935. (447449.)

14399. "Multiple unit treadle-controlled door system." National Pneumatic Co. July 5th, 1934. (447635.)

16318. "Electrolytic condensers." Plessey Co., Ltd. (P. R. Mallory & Co., Inc.) June 5th, 1935. (447639.)

16734. "Vacuum electric-discharge tubes." V. Wologdin. June 8th, 1935. (447578.)

17079. "Electric heating installations." M. E. N. Hasselblatt and Venesta, Ltd. June 13th, 1935. (447453.)

17703. "Electric supply systems." Ferranti, Ltd. (Ferranti Electric, Ltd.) June 20th, 1935. (447455.)

18276. "Electric switches particularly for controlling the current to electric cooking and heating apparatus." J. P. Reed. June 26th, 1935. (447456.)

19168. "Electrolytic condensers." Plessey Co., Ltd. November 15th, 1934. (447640.)

21115. "Electroplating plant." Langbein-Pfanhauser Werke Akt.-Ges. March 1st, 1935. (447587.)

23201. "Answer-back device for telegraph systems." E. E. Kleinschmidt. August 6th, 1935. (447715.)

24881. "Temperature regulators for electrically heated apparatus." British Thomson-Houston Co., Ltd. September 6th, 1934. (447527.)

25387. "Mounting devices for electron-discharge devices." Marconi's Wireless Telegraph Co., Ltd. September 12th, 1934. (447461.)

26782. "Manufacture of electric lamps and similar devices." British Thomson-Houston Co., Ltd. September 28th, 1934 (447720.)

27478. "Means for avoiding disturbances in the reception of electric oscillations." K. Pulvári-Pulvermacher. October 4th, 1935. (447593.)

27804. "Electric-discharge devices." Soc. Francaise Radio-Electrique. November 10th, 1934. (447723.)

28621. "Arc-gap arrangements for arc current convertors." E. Marx and H. Buchwald. October 25th, 1934. (447597.)

30005. "Braking apparatus for railway and other vehicles." Westinghouse Brake & Signal Co., Ltd. January 9th, 1935. (447727.)

30183. "Electromagnetic motor." K. Rimel. December 14th, 1934. (447658.)

30496. "Methods of and apparatus for the electrolytic manufacture of metallic magnesium." Y. Kato. January 11th, 1935. (Addition to 1077/35.) (Divided out of 1077/35.) (447600.)

33481. "Capacity surfaces for electrostatic devices for the recording and reproduction of sound." J. Massolle and J. Massolle Ges. December 3rd, 1934. (447662.)

33626. "Suspension of electrical fittings." Magna Wire and Cable Co., Ltd. (Hellux Akt.-Ges.) December 4th, 1935. (447663.)

34220. "Piezo-electric crystal arrangements." Telefunken Ges. für Drahtlose Telegraphie. December 10th, 1934. (Cognate application 34221/35.) (447665.)

34788. "Electric-discharge tubes." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. January 11th, 1935. (447534.)

1936

286. "Protective circuit arrangements for electric-arc furnaces." Siemens & Halske Akt.-Ges. March 7th, 1935. (447669.)

Trade Mark Applications

The following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from June 10th:—

Mekanikins. No. 566289. Class 6. Electrically operated advertising and display shelves.—Anthony Wood & Co., 50, Harold Road, Upper Norwood, S.E.19.

Design only. No. 567277. Class 8. Radio, rectifying, amplifying and frequency-changing valves.—Ever Ready Co. (Great Britain), Ltd., Hercules Place, Holloway, N.7.

Opal. No. 564244. Class 8. Electric batteries (not for medical purposes).—Jewell Battery Co., Ltd., 7, Lincoln's Inn Fields, W.C.2.

Progress; The Sign for Quality; British Made. No. 567784. Class 8. Electric dry cells and batteries (not for medical purposes).—British G.W.Z. Battery Co., Ltd., 5, Falmouth Road, Trading Estate, Slough, Bucks.

Rex Vita. No. 565481. Class 13. Electric lamps (ordinary). —Wartburg Lamps, Ltd., Imperial Works, Perron Street, Ryland Road, Kentish Town, N.W.5.

Bulldog (design only). No. 567420. Class 13. Sparking plug cable terminals, &c.—Abingdon Works (1931), Ltd., King's Road, Tyseley, Birmingham.

Katholite. No. 567642. Class 18. Emergency electric lighting installations for buildings.—D.P. Battery Co., Ltd., Bakewell, Derbyshire.

Interohm (lettering and design). No. 568007. Class 50. Electrical insulating varnishes and substances of asbestos, mica, oils or bitumen.—Interohm Electrical Insulators, Ltd., 31-32 Grosvenor Place, Westminster, S.W.1.

New Indian Electrical Association

It is reported in *Indian Engineering* that a new association has been formed in Calcutta, with offices at No. 12, Waterloo Street, under the name of "Chamber of Electrical Engineers," and that many leading electrical engineers of the Corporation of Calcutta, Government of Bengal, Port Commissioners, Railways, &c., have joined. The main object is to encourage the use of electricity among the general public. To this end the board has decided to start an information bureau for the public.

New Work for Contractors

Particulars of new works and building schemes for the use of electrical installation contractors and traders

Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aberdeen.—Reconstruction, after fire, of Queen's Cinema, Union Street; the manager.

Alderley Edge (CHESHIRE).—Houses (20); C. Watkins, U.D.C. surveyor.

Aldridge (STAFFORDSHIRE).—Houses (60); U.D.C. surveyor.

Ayrshire.—Remodelling, Galston Higher Grade school, with extensions (£20,511); director of education, Ayr.

Barking.—Factory, for Potter & Clarke, Ltd., 60, Artillery Lane, London, E.1.

Barrow-in-Furness.—Laundry, Abbey Road; Lakeland Laundries. Extensions to hospital, Devonshire Road (£17,500); borough engineer.

Birkenhead.—Hotel, Clifton Crescent, electrical work (£25,000), for William Richardson.

Bishop Auckland.—Additions to the Town Hall; U.D.C. surveyor.

Blackburn.—Houses (34), Livesey Branch Road; Bainbridge Bros., builders, Livesey Branch Road.

Blaenavon.—Church (electrical work), for the Methodist trustees; D. C. Udell, architect, Pontypool.

Brighton.—Fire station, Preston Circus; borough engineer.

Bromley.—Houses (43), Pickhurst Mead; H. F. Thorburn, Ltd. Houses (23), Hayes Place estate; Henry Boot (Garden Estate), Ltd.

Buntingford (HERTFORDSHIRE).—Houses (20); H. J. Hitch, builder, Roydon.

Carlisle.—Houses (55), Caldew Vale; Laing & Son, Ltd. Houses (24), Raffles estate; J. & R. Bell, Ltd. Houses (80), Warwick Street; E. J. Hill.

Cheltenham.—Extension to factory (£80,000), for the United Chemists' Association, Ltd.

Chesterfield.—Houses, Walton Road; Houfton & Kington, architects. Development of Bacons Lane estate, with central hall; borough engineer. Infirmary, Whittington Hall, High Street; wardens. Extensions to works, Derby Road; Chesterfield Tube Co., Ltd.

Coatbridge.—Public swimming pool, Public Health offices, and clinic (£57,000); burgh surveyor.

Colchester.—Houses (32), Barn Hall Avenue, White Hall estate, for S. E. Baillie. Extensions to County hospital, Gray Road; Duncan Clark & Beckett, architects.

Coventry.—Factory, for Copper Sheets, Ltd. Factory, for the Coventry Felt Co.

Crewe.—Cinema, Earle Street, for A. Hand, Kino Cinema.

Dagenham.—Houses (184), Foxlands estate, for Edward Glenny & Son, Ripple Road, Barking.

Dumfries.—Houses (100), Nithside; burgh surveyor.

Dundee.—Modernising and reconstructing school, &c. (£28,000), for the High School directors; Allan and Friskin, architects.

Easington (Co. DURHAM).—Houses (2,000); North Eastern Housing Association, Metrovic House, Newcastle-on-Tyne.

Edinburgh.—Houses (292), Carrick Knowe district, for MacTaggart & Mickel, Ltd., 65, Bath Street, Glasgow; Stewart Kaye, architect, 14, Hill Street, Edinburgh.

Feltham (MIDDLESEX).—Factory, for the Champion Sparking Plug Co., Ltd.

Gillingham (KENT).—Houses (54), Sunnymead Avenue, for Vinall & Chappell. Houses (31), Priory Road, for C. J. Howard.

Glasgow.—Houses (198), Haghill & Knightswood; housing director. Cinema, Shettleston Street; J. D. Macdonald, solicitor.

Great Yarmouth.—Senior schools, Gorleston, for Borough E.C.; F. R. B. Haward, architect. Reconstruction of Coliseum Cinema; Douglas M. Attree, lessee.

Haltwhistle.—Houses (27), Greencroft; Messrs. Watson, builders.

Harrogate.—Bus station and garage, for the West Yorkshire Road Car Co.

Hastings.—Houses (20), Briars estate, St. Leonards, for George Fryer; F. Gordon Watford, architect. Estate development, Downs Road; Jeffery & Wyatt, architects.

Hemel Hempstead.—Firework factory, Cherry Tree Lane, for K. C. Gray, Wood End Lane.

Houghton-le-Spring.—Houses (47), Chilton Moor estate; U.D.C. surveyor.

Huddersfield.—Palace Theatre, electrical work; Mark Brook & Sons, builders, Leeds Road.

Irish Free State.—(CASTLEPOLLARD, Co. WESTMEATH).—Vocational school, for County Westmeath Vocational E.C. Courthouse, Mullingar; Scott & Good, architects, 36, South Frederick Street, Dublin. (MUINEBEAG, CARLOW).—Houses, Kilcarrig Street, Barrett Street, and Fairgreen site; F. Gibney, architect, 16, Westmoreland Street, Dublin. (RINGSEND, DUBLIN).—Electrical work at technical schools, for City of Dublin Vocational E.C., Bolton Street, Dublin; L. E. O'Carroll, chief executive officer.

Kilmarnock.—Houses (28), Linfern Avenue, for James Rome & Sons, Woodstock Street. Houses (100), Riccarton; burgh surveyor.

Kirkcaldy.—Extension to factory (£60,000), for Michael Nairn & Co., Ltd.

Lichfield.—Houses (50), Stychbrook estate (£17,927); R. T. Rix & Son.

Llanidloes.—Houses (20), Cwmdu; borough surveyor.

London.—(BERMONDSEY).—Four-storey building, for Fishers Wharves and Granaries, Ltd., 168a, Rotherhithe Street, S.E.16. (EAST HAM).—Houses, Stevenage Road, and extensions to Shopping Hall, Myrtle Road; R. J. Slater, architect, 199, Plashet Grove, E.6. (LEWISHAM).—Houses (60), Sydenham Park; John Hodges, 101, Great Russell Street, W.C.1. (WILLESDEN).—Factory, for the Anzora Perfumery Co., Ltd., 28, Willesden Lane, N.W.6. (WOOLWICH).—Central stores, Powis Street, for Royal Arsenal Co-operative Society; secretary. (HAMMERSMITH).—Tenements, Emyln Road (£146,982); borough engineer. (CHELSEA).—Extensions to 317, Fulham Road; Parkes Chemists, Ltd.

Lowestoft.—Development of Grove Farm estate, Pakefield; C. Hadenham.

Mirfield.—Houses (63); U.D.C. surveyor.

Morecambe.—Houses (28), Bellefield estate; F. Armistead. Houses (68), Thirlmere Drive; W. Sanders.

Morpeth.—Houses, Pegswood and Widdrington Station; R.D.C. surveyor.

Newark.—Houses (112), for the Economic Housing Estates, Ltd.

Newbury (BERKSHIRE).—Church, St. Mary's Hill, for the Baptist trustees; Rev. A. J. Stanton.

Newmilns.—Houses (£65,750); burgh surveyor.

Northamptonshire.—Secondary school, Daventry, for County E.C.; J. T. Blackwell, architect, Gold Street Chambers, Kettering.

North Riding.—Alterations to the Grangetown Junior School for County E.C.; county architect, Northallerton.

Ossett.—Improvements to Palladium cinema; Palladium, Ltd.

Oswestry.—Aerodrome; borough engineer.

Paignton.—Houses (28), Colley End Road; Coombe & Sons. Seven shops and flats, Torquay Road; J. Somerville.

Penmaenmawr (CAERNARVONSHIRE).—Cinema (electrical work); William Evans (Pentraeth), Ltd., builders, Anglesey.

Ponteland (NORTHUMBERLAND).—Houses (78), Castle Ward; J. Jameson, U.D.C. surveyor, Council Offices.

Portsmouth.—Church, Devonshire Avenue; Baptist trustees.

Reading.—School, Caversham, for Borough E.C.; W. R. Howell, architect, Blagrave Street.

Redditch.—Houses (30), Beoley Road; H. A. Bright. Houses (42), Prospect Hill estate; Redditch Land Co. Factory, Castle Street; J. Perkins & Sons.

Richmond (SURREY).—Houses (104) and flats; borough surveyor.

Ross (HEREFORDSHIRE).—Houses (20 acre site); U.D.C. surveyor.

Rutland.—Two central schools, South Luffenham and Casterton, Oakham (£36,320), for C.C.; W. Rosser, architect, 38, Kingsley Road, Northampton.

St. Mary Cray (KENT).—Factory, for Prentif, Ltd.

Salford.—School, Lancaster Road estate; director of education.

Scarborough.—Office and waiting room, Somerset Terrace, for the United Automobile Services, Ltd.; H. J. Starkey, architect, 2, Dean Farrer Street, London, S.W.1.

Seaford-on-Sea.—Houses (75); U.D.C. surveyor.

Selsdon (SURREY).—Church (electrical work); Joseph Dorey & Co., Ltd., builders, Brentford.

Sittingbourne.—Bakery, for the Co-operative Society; E. Bishop & Sons, Ltd., builders.

Southall.—Houses (58), Allenby Road; New Ideal Homesteads, Ltd., Ideal House, Carlton Road, Erith. Houses (24), Lady Margaret Road; G. Wimpey & Co., Ltd.

Southport.—Estate development of Mill Road, Ainsdale; Ince Blundell Estate. Theatre, Wright Street, Liverpool Victoria Friendly Society.

Stirlingshire.—Houses (100), Bannockburn, for C.C.; Copland and Blakey, architects, 76, High Street, Falkirk.

Stockport.—Houses (150), Parsonage estate, near Heaton Moor Road; Whitley Napier Estates, Ltd., builders, Stanley Road, Heaton Moor. Cinema, Reddish, electrical work; Roberts, Wood & Elder.

Stratford-on-Avon.—Houses (72); R.D.C. surveyor.

Sunderland.—Furniture factory, Low Street, for E. Duke; G. E. Matkin, architect, Barclays Chambers, Fawcett Street. Extensions to factory for I. Jacobs; S. J. Stephenson and Gillis, architects, 2, Saville Place, Newcastle-on-Tyne.

Swindon.—Cinema and shop, Regent Street; W. R. Glen, architect.

Taunton.—Houses (24), Bridgwater Road; Ivor F. Shellard, borough engineer.

Tow Law (Co. DURHAM).—Houses (50), for the North-Eastern Housing Association, Ltd., Newcastle-on-Tyne; R. A. F. Liddell, builder, 2, Albany Avenue, Benton, Newcastle-on-Tyne.

Tynemouth.—Completion of the Moor Park Isolation Hospital (£23,000); borough engineer.

Wakefield.—Extensions to Victoria Mills, Alverthorpe Road; J. & J. Archer, Ltd.

Walsall.—Houses (96), Ryecroft estate (£30,676); Jack Winstance, Ltd.

Walton-le-Dale.—Houses (20); J. Hardman, builder.

Warrington.—Houses (37), Hallows Avenue; R. & S. Smith.

Welling (KENT).—Church, Kelvin Road, Belle Grove, for the Congregational trustees; secretary, Upper Wickham Lane.

Wellington (SOMERSET).—Houses (80), Langforth; E. T. Howard, U.D.C. surveyor.

Westmorland.—Isolation Hospital, Parkside, Kendal (£31,000); county surveyor, Kendal.

Weymouth.—Church, Radipole, for the Congregational trustees; secretary. Houses (140); R. Phillips, builder, 76, Heathfield Avenue, Crayford, Kent.

Wigan.—School (500 places), Beech Hill; director of education.

York.—Theatre (£60,000), electrical work, for the Odeon Theatres, Ltd.; Harry W. Weedon, architect, 84, Colmore Row, Birmingham.